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L1630200005/St. Clair County
Waggoner Trucking Company
AKA Site L
ILD 984809269
Superfund/HRS

CERCLA

Preliminary Assessment Report

Illinois Environmental
Protection Agency
P.O. Box 19276,
Springfield, IL 62794-9276

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CERCLA Preliminary Assessment Report

for

Waggoner Trucking Co. AKA Site L

ILD 984809269

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SECTION 1

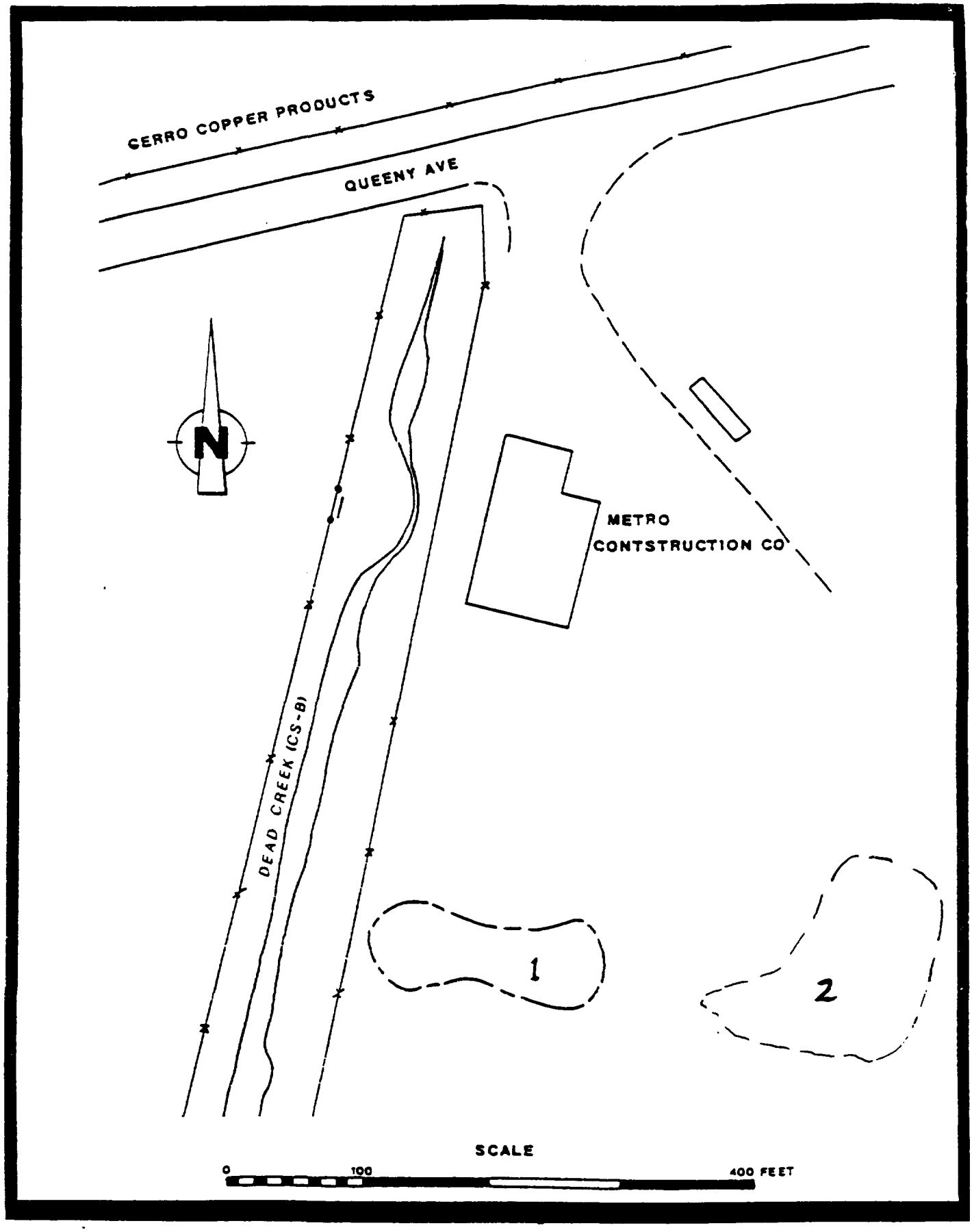
EXECUTIVE SUMMARY

Executive Summary

Waggoner Trucking Company was placed on the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) on October 26, 1990, as a result of a request for discovery action initiated by the Illinois Environmental Protection Agency (IEPA). This action was taken as a result of previously documented waste disposal practices at the site and the belief that Waggoner Trucking Company is one of many sites in Sauget (formerly Monsanto) and northern Cahokia, which has contributed to the degradation of environmental quality in this area.

Waggoner Trucking Company is also known as Site L in IEPA file information. Therefore, this report will also refer to Waggoner Trucking Company as Site L for simplicity's sake.

Site L is the former location of **two surface impoundments** used by hazardous and special waste haulers to dispose of wash water from truck cleaning operations. One 70 feet by 150 feet impoundment was located approximately 250 feet south of the present Metro Construction Equipment Company (Metro) building and approximately 125 feet east of Dead Creek. The second impoundment was due east of the first This boot shapped impoundment had roughly the same area as the other. The features of each of the former lagoons are depicted on the following page.


CERRO COPPER PRODUCTS
QUEENY AVE
N
METRO
CONTSTRUCTION CO
DEAD CREEK (CS-B)
1
2
SCALE
0
100
400 FEET

Site L is located in a commercialized/industrialized area of northern Cahokia, just south of Sauget, Illinois. The geographic location is within the Southeast quarter of Section 26, Township 2 North, Range 10 West of the Third Principal Meridian in St. Clair County.

Harold Waggoner started his waste hauling business at Site L in 1964. Prior to that time, the parcel was used for agricultural purposes. **For 10 years,** the Waggoner Trucking Company specialized in hauling industrial wastes for companies in the St. Louis/Metro East area. In April, 1971, an IEPA inspector observed a Waggoner Trucking Company tank truck discharging material directly into Dead Creek. In August of that year, Waggoner Trucking Company responded to IEPA's citation stating that discharges to Dead Creek had ceased and the company was now using a pit for discharges. Based on aerial photographs from the 1970's, it appears that the use of the second impoundment began in 1973. In 1974, Harold Waggoner sold the operation to the Ruan Trucking Company who continued the practice of dumping wash water into the impoundments until 1978. The property was then leased to and later purchased by Tony and Velma Lechner of St. Louis, Missouri. The Lechner's own the Metro Construction Equipment Company.

In a 1980 IEPA study of the Dead Creek area, (St. John Report), Site L was identified as a source of both ground-

water and surface water contamination in the area. The IEPA study included the collection of several soil/sediment samples in and along Dead Creek and a groundwater sample down-gradient of Site L. The soil/sediment samples showed high levels of aromatic and chlorinated aromatic hydrocarbons, PCB's and heavy metals while the down-gradient well had levels of some inorganic contaminants an order of magnitude (10 times) higher than up-gradient wells, adjacent the creek (see Reference #1 for the sample locations and results).

In 1985, IEPA contracted Ecology and Environment, Incorporated (E&E) to investigate 12 suspected uncontrolled hazardous waste sites and six segments of Dead Creek in Sauget and Cahokia. Site L was among the 12 sites with which soil borings, a magnetometry study, a electro-magnetic (EM) survey, soil gas, and samples of surface water, surface water sediments, soil and groundwater were collected. The results of the IEPA financed investigation, were used in the preparation of this report.

During the investigation of Site L, the second lagoon had not yet been discovered, therefore, the second lagoon was not studied. The four drilled borings documented that the first surface impoundment at Site L was an unlined shallow excavation, approximately 8 feet deep, which extended into the sandy silt deposits of the upper Cahokia Alluvium. A

geologic cross-section of Site L was developed from the 4 soil borings. The cross section and boring logs are included as Reference #2 of this report. Two of the borings, L2 and L3, were assumed to be located within the confines of the old impoundment. In these borings, 5 to 8 feet of fill material consisting of black cinders, clay, concrete, and brick, overlie loose sandy to clayey silt which grades to silty fine sand at approximately 17 feet. The bottom of the excavation is assumed to be where the fill material contacts the silt. The silt and sand deposits were found to be extensively stained from approximately 5 feet to the termination of the borings at 20 feet.

The two geophysical studies indicated that the site lacked any buried ferrous materials. The fluxgate gradiometer magnetometry (MAG) data was inconclusive due to interferences from heavy construction equipment located on-site. The EM survey results used various coil alignments to obtain readings from various depths, however, no significant anomalies where observed.

Volatile soil gases were tested at 10 locations across Site L. At five of the locations, volatile organic soil gases were substantially above background. These locations were across the northern half of Site L, where the buried impoundment lies. The soil gas concentrations ranged from 30 to more than 1000 milligrams per liter of air (mg/l).

Results of the soil gas tests, as well as the surface water, creek sediment, subsurface soil and groundwater sample results are all included in Reference #3.

Creek Segment B (CS-B) is the portion of Dead Creek which intermittently flows between Queeny Avenue and Judith Lane in Sauget and Cahokia. Site L is located near the middle of this segment, on the east side of the creek. Nitroaniline, Aroclor 1260 (PCB) and elevated levels of cadmium, mercury, copper, barium, arsenic, chromium and lead were all detected in surface water samples of CS-B. The CS-B sediment samples found volatiles as well as greater numbers and concentrations of semi-volatiles near Site L.

Five subsurface soil samples collected from the 4 borings at Site L. The analytical results showed a total of 6 volatiles in the 5 samples with sample L3-04 containing the highest concentration of any one compound, 27 milligrams per kilogram (mg/kg) of toluene. Five volatiles were detected in sample L2-03, and four were detected in samples L3-04, L4-09, and L4-10.

A total of 13 semi-volatile compounds were detected in 3 of the 5 samples. Sample L2-03 contained 9 semi-volatiles, sample L3-04 contained 8, sample L4-10 contained 1 and samples L1-02 and L4-09 had no semi-volatiles detected. The highest concentration of any one contaminant was

pentachlorophenol at 58 mg/kg in sample L3-04. The table on the following page summarizes the subsurface sample results for Site L.

Summary of Subsurface Soil Sample Results for Site L

Chemical Name	# of Detections	Highest Concentration	Sample #
Volatiles			
toluene	4	27	L3-04
t-1,2-dichloroethene	3	20	L3-04
benzene	4	4.2	L3-04
ethylbenzene	1	0.04J	L2-03
xylenes	2	0.67J	L3-04
4-methyl-pentanone	4	0.17	L2-03
Semi-volatiles			
1,4-dichlorobenzene	1	0.21J	L3-04
naphthalene	2	0.53J	L3-04
2-methylnaphthalene	2	1.1J	L3-04
methylphenol	2	1.1J	L3-04
phenol	2	1.5J	L3-04
pentachlorophenol	2	58	L3-04
benzo(a)anthracene	1	0.91J	L3-04
chrysene	1	0.2J	L2-03
fluoranthene	1	0.45J	L2-03
phenanthrene	2	1.8J	L3-04

#-number, w/-with, J-estimated value, concentrations in mg/kg

Although no pesticides or PCB's were detected in the Site L subsurface soil samples, inorganic contaminants were found. Elevated concentrations of antimony, copper, lead and nickel were found in the samples. The high concentrations of antimony and nickel were about 100 times background concentrations while the high concentrations of lead and

copper were 2 to 5 times background.

A sample collected from the monitor well at Site L, was found to contain four volatiles. The two compounds with the highest concentrations detected in sample GW-37 were toluene at 0.97B (B-found in blank) mg/l and chloroform at 0.73 mg/l. Six semi-volatiles were also detected in the sample.

The highest concentration of any semi-volatiles detected were for phenol and 2-chlorophenol, which were both detected at 0.15 mg/l. The next highest concentrations were 0.075 mg/l of 4-methylphenol and 0.06 mg/l of 4-chloroaniline.

As in the case of the subsurface soil samples, groundwater sample analysis did not reveal pesticides or PCB's. However, the concentrations of inorganic parameters were greater than background for arsenic, cadmium, cobalt, vanadium, and zinc.

IEPA personnel conducted a site reconnaissance of Site L on March 13, 1991. Mara Maginnis and Paul Takacs from IEPA, accompanied this author on the visit to the Sauget sites. As noted previously, Site L is now the Metro Construction Equipment Company. The property is bordered: on the north by Queeny Avenue and Cerro Copper Products; on the east by Site H (a former landfill which is now a vacant open field owned by Roger's Cartage Company) and Kelly Construction

Company; on the south by an open field; and on the west by a fenced portion of Dead Creek, CS-B. These areas are visible in an aerial photograph contained in Section 3 of this report.

The site is currently covered with black cinders, and is used by Metro Construction Equipment Company for equipment storage. Several piles of pipes, a dirt pile, a crane and semi-truck trailers are stored on site. The site is relatively flat and do to the permeable nature of the cinders, much of the rain water would infiltrate into the subsurface, otherwise runoff would flow to CS-B. No waste material is visible on the surface of the site. Access to Metro Construction Equipment Company is not controlled.

Site L is located in an area known as the American Bottoms. The upper stratigraphy in this area consists of 70-120 feet of unconsolidated alluvium and glacial outwash overlying Mississippian aged limestone and sandstone formations (Ste. Genevieve and St. Louis Limestones). The valley fill deposits are composed of two formations, the uppermost being the Cahokia Alluvium followed by the Mackinaw Member of the Henry Formation.

The Cahokia Alluvium is composed predominantly of silt, clay and fine sand deposits, generally indicative of a aggrading environment. In the vicinity of Dead Creek, these deposits

vary in thickness, with a range of 15 to 30 feet. This formation was laid down via flood events, eolian activity, bank slumping, erosion and/or slugs of material deposited directly by tributary steams. The Mississippi River has frequently reworked this formation in such a way that coarser material is intermingled with finer-grained deposits.

Underlying the Cahokia Alluvium is the Mackinaw Member of the Henry Formation. This formation is composed of sand and gravel from glacial outwash. At the Dead Creek area, this material rest directly on the bedrock surface and varies between 70 and 100 feet in thickness. Reference #4 contains area well logs which describe the area geology.

Local hydrogeologic information has been obtained through groundwater monitoring in the Dead Creek area. In the vicinity of Site L, shallow sand and gravel deposits close to the ground surface, yield significant quantities of water for nearby homes and business. Horizontal groundwater movement in the shallow deposits generally follow the land surface topography, with lateral movement toward local discharge zones (wells and small streams), and some movement into the deeper unconsolidated aquifers. Groundwater is encountered between 10 and 28 feet below the ground surface in the Dead Creek area. Under Site L, the aquifer of concern (AOC) is encountered at 10 feet. Groundwater in the deeper unconsolidated valley fill deposits generally follows the

bedrock surface. Accordingly, groundwater generally flows downstream through the sand and gravel aquifers in much the same direction as the original stream flow, but at a much slower rate.

Most area residents are supplied with drinking water by the Illinois-American Water Company (IAWC) which operates an intake on the Mississippi River upstream of Sauget. IAWC sells the water to the various water departments and districts within the Sauget/Cahokia area. However, some area residents do obtain drinking water from shallow wells. Illinois Department of Public Health (IDPH) files and Illinois State Water Survey (ISWS) well logs indicate at least 50 area residents have wells which are used for drinking or irrigation. These wells are located in Cahokia (23), East St. Louis (5), East Carondelet (16) and Dupo (6). These do not include the wells at the homes on Judith Lane in Cahokia or an unknown number of residents in the Schmids Lake area (approximately 3.75 miles southwest) that are not covered by any public water distribution. A 1983 report by the Southwestern Illinois Metropolitan and Regional Planning Commission (SIMRPC) listed 69 residences in Centreville Township (includes Sauget, Cahokia, Alorton and Centreville) which use private water systems. The same report lists 57 residences in East St. Louis and 365 residences in Sugarloaf Township (includes Dupo, North Dupo and East Carondelet). SIMRPC based their report on 1980 census data. Reference #5

contains a map which pin-points some of the ISWS well locations and a printout of area wells.

Surface water drainage that enters the intermittent Dead Creek (AKA Old Cahokia Creek and Rigolet Creek), travels south and southwest through its course. As the creek exits the village of Cahokia, it enters a large wetland. The wetland and Dead Creek drain underneath the 500-year levee (with flood control gate that protects the villages of Sauget and Cahokia) into the Old Prairie DuPont Creek. From the Old Prairie DuPont Creek, water flows west into the Cahokia Chute which discharges into the Mississippi River at river mile 174.2.

The average discharge of the Mississippi River, as measured over a 128 year period at St. Louis, Missouri, is 179,800 cubic feet per second. The Old Prairie DuPont Creek and the Cahokia Chute are minimal streams that lack stream flow information. The probable point of entry (PPE) is where the Dead Creek wetland area enters Old Prairie DuPont Creek, 16,440 feet or 3.11 miles from Site L. The flow distance from the PPE to the Mississippi River is 8,520 feet or 1.61 miles. A 15-mile surface water map is included in Section 3 of this report. The 15-mile surface water target limit extends to Mississippi River mile 160.8.

Surface water use in the immediate area (from Mississippi

River mile 174 to 178) is limited to recreation and freight trafficking. The upstream surface water intake (river mile 181), which supplies most of the Illinois side area residents, was mentioned in a previous paragraph. The city of St. Louis is also supplied by an upstream surface water intake, about 12 miles north at river mile 190. At downstream river mile 149 (about 28 river miles south), the village of Crystal City, Missouri (population 4000) utilizes a Ranney well, adjacent the Mississippi River, for drinking water. A well of this kind, is assumed to draw in surface water due to its construction and location to the river. On the Illinois side, the nearest downstream surface water intake is located approximately 65 river miles south, at river mile 110. The intake is used by the town of Chester and surrounding communities in Randolf County.

According to the Illinois Department of Conservation (IDOC), the Resource Inventory for the Mississippi River at river miles 178-162 shows fishing areas, sport fishing areas, important wildlife habitat and bald eagle use at selected areas in this reach. Correspondence from IDOC, details the aforementioned sensitive areas in Reference #6.

Although air samples have not been collected from Site L, the potential for an air release exists, due to the off gassing of contaminated soil. As noted early in this report, access to Metro Construction Equipment Company property is not

restricted. Contamination is within 2 feet of the surface, however there are no homes or schools that border the site.

Through 1990 U.S. Census data, it has been estimated that about 2000 people live within a mile Site L and about 148,000 people live within 4-miles. The following table shows the 4-mile radius population calculation. According to the Illinois Department of Commerce and Community Affairs (1988), approximately 3,200 people are employed in the immediate area of the site.

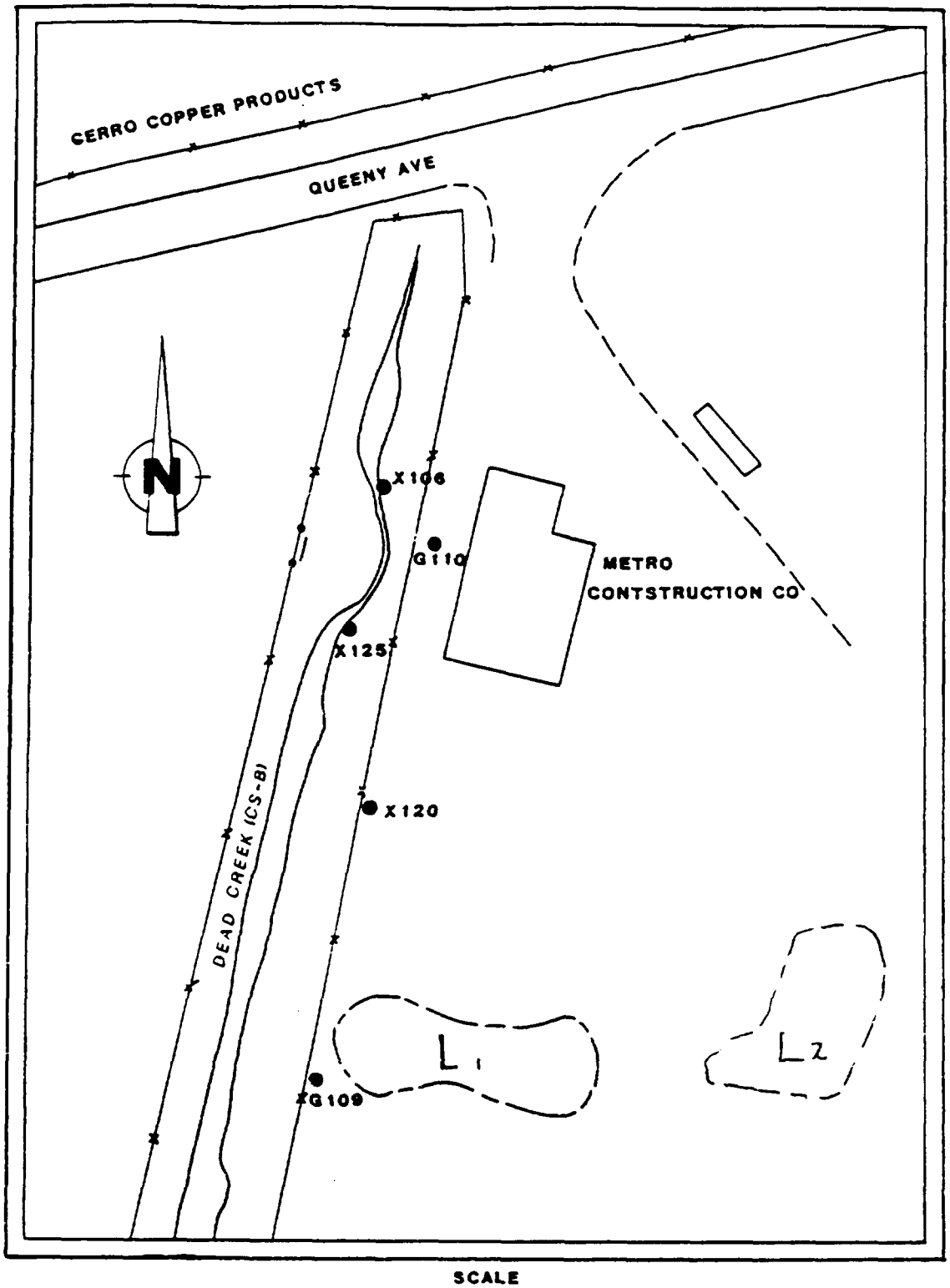
Target Population Calculation

City	Population Density/ Total Population	Area w/in 4-Mile Radius	Population w/in 4-Mile Radius
St. Louis	7,379/sq mi	11.5 sq mi	84,826
E. St. Louis	4,119/sq mi	8.5 sq mi	34,875
Alorton	2,237	100%	2,237
Cahokia	18,904	100%	18,904
Centreville	9,747	75%	7,310

Total Target Population = 148,152

A high priority has been assigned to this site. In order to quantitatively determine the threat posed by the former hazardous waste lagoon and corresponding contaminated soil/sediments, a CERCLA Screening Site Inspection should be conducted at Waggoner Trucking Company/Site L. This site will be aggregated along with nine other similar sites in the immediate area (Sauget Sites Area #1), so as to more

accurately assess their cumulative health risks and environmental threats.



SCALE

0 100 400 FEET

LEGEND

G110 IEPA MONITORING WELL

X120 IEPA SOIL SAMPLING LOCATION

DEAD CREEK SITE AREA L WITH SAMPLING LOCATIONS

Exhibit 47

#7

AGREEMENT OF LEASE AND SALE

This Agreement made this 12th day of March, 1974, by and between Ruan Transport Corporation, an Iowa corporation, having its principal place of business in Des Moines, Iowa, hereinafter sometimes referred to as "RUAN," and Harold Waggoner & Company, a Delaware corporation, having its principal place of business in Collinsville, Illinois, hereinafter sometimes referred to as "WAGGONER."

WITNESSETH:

WHEREAS, RUAN is a common carrier of commodities in bulk by motor vehicle in interstate commerce pursuant to Certificates of Public Convenience and Necessity duly granted by the Interstate Commerce Commission, hereinafter sometimes referred to as "Commission," in Docket No. MC-107496 and Subs thereto, and in intrastate commerce pursuant to appropriate authorities duly granted by the respective state regulatory agencies holding jurisdiction thereof; and

WHEREAS, WAGGONER is a contract carrier of commodities in bulk by motor vehicle in interstate commerce pursuant to permits duly granted by the Commission in Docket No. MC-115873 and Subs thereto, and authorities in intrastate commerce pursuant to appropriate agencies duly granted by the respective state regulatory agencies holding jurisdiction thereof;

WHEREAS, RUAN and WAGGONER desire to enter into an agreement wherein WAGGONER will sell to RUAN and RUAN will purchase certain authorities, equipment, and real estate more specifically described herein;

NOW, THEREFORE, in consideration of the convenants, conditions, and agreements hereinafter recited and subject to all requisite governmental approvals and authorizations, the parties hereto covenant and agree upon the following terms and conditions:

1. Sale of Rights. Subject to the prior approval of the Commission and all such other governmental approvals as by law may be required, WAGGONER hereby bargains, sells, transfers and conveys, free and clear of all liens and

encumbrances of every kind and description, to RUAN or assigns, all right, title and interest in and to the said interstate and intrastate operating rights duly granted to WAGGONER by the Commission and the appropriate regulatory agencies of the states of Illinois and Missouri, as set forth, respectively, in Appendix A hereto.

2. The final consummation date shall be twenty (20) days after the effective date of the final order of approval of this purchase and conversion and transfer of authority by the Interstate Commerce Commission and the appropriate regulatory body of the state of Illinois or the date of the entry of judgment by the last court of review, whichever occurs last, or such other date within twenty (20) days of the same as RUAN shall elect by written notice to WAGGONER mailed at least five (5) days prior thereto. For purposes of this Agreement, a final order shall be taken to be an order which by its terms authorizes RUAN to purchase and convert the authority in accordance with the terms of this agreement and without restrictions on the continued use of the operating rights or with restrictions thereon which are acceptable to RUAN and which by its terms is final and effective and from which no further appeal is taken. The "temporary consummation date" shall be within twenty (20) days after the effective date of the order of approval of this lease of operating rights of WAGGONER by the Interstate Commerce Commission and the appropriate regulatory body of the state of Illinois. The final and temporary consummation of this agreement shall take place in such place and at such offices as the parties mutually agree upon.

3. Purchase Price of Rights. In consideration of the sale and transfer of the said operating rights, RUAN agrees to pay to WAGGONER a maximum purchase price of two hundred thousand ($200,000.00) Dollars payable as follows:

> twenty thousand ($20,000.00) Dollars on date of final consummation and the balance in ten (10) annual installments of eighteen thousand ($18,000.00) each, the first installments commencing one (1) year after date of final consummation;

provided, however, that such payments or sums as may be paid by RUAN to WAGGONER during the period of the temporary lease of authority as hereinafter described, will reduce proportionately the said purchase price.

4. Regulatory Approval and Lease of Rights. The parties hereto forthwith will apply to and petition the said Commission and all such other regulatory agencies as by law may be requisite for authority to convert the contract carrier permit issued by the Commission to a common carrier certificate and to purchase the authorities, equipment, land and building described in Appendices, A, B and C hereto. Simultaneously therewith the parties shall seek all necessary authorities to lease the said properties temporarily. Upon the grant of authority to lease the said rights, RUAN will pay to WAGGONER in cash or credits a monthly rental of five percent (5%) of the total gross revenues derived from Operations over the said rights computed monthly; provided, however, that in the event all requisite regulatory approval for the proposed purchase is obtained, the said rental payments will be applied in reduction of the purchase price referred to in Paragraph 3 above. Should the purchase of rights not be consummated WAGGONER will retain all monies paid pursuant to this paragraph.

5. Preparation of Applications. WAGGONER will supply to counsel for RUAN all necessary documents, authorizations, statements and things as may be required or deemed useful by said counsel in the preparation of the necessary applications and amendments, and will make available such witnesses as said counsel may request to appear at any public hearing or in the preparation of verified statements for submission before the said Commission and regulatory agencies or otherwise.

6. Sale of Equipment. Subject to the prior approval of the Commission and of such other governmental agencies as by law may be required, WAGGONER hereby bargains, sells, transfers, and conveys, free of all liens and encumbrances of every kind and description, to RUAN or assigns, all right, title, and interest in and to the equipment as set forth in Appendix B hereto.

7. Purchase Price of Equipment. In consideration of the sale and transfer of said equipment, RUAN agrees to pay to WAGGONER the total purchase price of Two Hundred Twelve Thousand Dollars ($212,000), subject, however, to the following conditions:

A. WAGGONER shall be free to sell at any time any item of equipment listed on Appendix B hereto with the exception of the 16 trailers, the listing for which is accompanied by an asterisk and for which no agreed value is shown. The sale by WAGGONER of any item of equipment shall be at or above the listed agreed value thereof and, when any such sale takes place, the agreed purchase price of Two Hundred Twelve Thousand Dollars ($212,000) shall be reduced by the agreed value of the equipment sold.

B. Upon the date this agreement is executed, RUAN will make a payment of Thirty Thousand Dollars ($30,000) on the total purchase price, and upon the date the application for temporary lease is acted upon, shall make an additional payment of Thirty Two Thousand Dollars, ($32,000). In event approval of the entire transaction is granted, RUAN will pay the balance of the agreed purchase price in ten annual installments of Fifteen Thousand Dollars ($15,000) each, the first installment being due upon consummation of the transaction.

8. Sale of Land and Buildings. Subject to the prior approval of the Commission and all such other governmental approvals as by law may be required, WAGGONER hereby bargains, sells, transfers and conveys, free and clear of all liens and encumbrances of every kind and description, to RUAN, all right, title and interest in and to the land and buildings as set forth, in Appendix C hereto.

9. Purchase Price of Land and Buildings. In consideration of the sale and transfer of said land and buildings, RUAN agrees to pay to WAGGONER a maximum purchase price of forty-two thousand five hundred ($42,500.00) Dollars for the land and eighty two thousand five hundred ($82,500.00) Dollars for the buildings payable as follows:

> twelve thousand five hundred ($12,500.00) Dollars on date of final consummation and the balance in ten (10) annual installments of eleven thousand two hundred fifty ($11,250.00) Dollars each, the first installments commencingone (1) year after date of final consummation;

provided, however, that such payments of sums as may be paid by RUAN to WAGGONER during the period of the temporary lease of authority as hereinafter described will reduce proportionately the said purchase price.

WAGGONER, on date of final consummation, delivers to RUAN a contract for sale of said property according to terms and conditions of sale as stated herein.

Upon date of last payment WAGGONER will deliver to RUAN a warranty deed conveying good and merchantible title to the described property, free and clear of all liens and encumbrances.

RUAN will, from and after date of final consummation, pay all real estate taxes on said property. WAGGONER will pay all taxes up to said date of final consummation.

Should WAGGONER make any capital improvements between date of this agreement and date of final payment, said purchase price will be increased by the cost thereof. No capital improvements shall be made without RUAN'S approval and consent.

10. Lease of Land and Buildings. RUAN further agrees to lease from WAGGONER the land and buildings described in Appendix C hereto for the duration of temporary lease of operating rights; and in rental payment thereof, RUAN will

pay to WAGGONER in cash or credits nine hundred ($900.00) Dollars per month, provided, however, that all capital improvements which may be required in order to preserve the life and use of said buildings and use of said land shall be paid by WAGGONER with an appropriate adjustment in the monthly rental to defray any increase in depreciation or other cost or expense. In the event the purchase of rights herein contemplated ultimately is consummated, said rental payments will be applied in reduction of the purchase price. Should the purchase of rights not be consummated WAGGONER will retain all monies paid pursuant to this paragraph.

11. Inventories. Upon date of final consummation RUAN will purchase from WAGGONER existing inventories, such as tires and oil at WAGGONER'S cost.

12. Insurance. Up to date of final consummation, WAGGONER will insure the buildings from damage due to fire and extended coverage in an amount not less than seventy-five thousand ($75,000.00) Dollars and will furnish RUAN a certificate of said coverage naming RUAN as an additional insured thereon. During period of temporary lease RUAN will carry public liability, property damage and collision insurance on the tractors and trailers listed on Appendix B and will furnish WAGGONER with a certificate of said coverage. WAGGONER will be named as an additional insured on RUAN'S policy.

13. Consummation. Within the allowable time set forth in the final order of the Commission and such other regulatory agency obtaining jurisdiction thereof approving this transaction, or such extensions of time as may be allowed, the parties hereto will execute or obtain the execution of an appropriate notice of consummation which thereafter, promptly will be filed with the said Commission and agencies.

14. Representations and Warranties. WAGGONER represents and warrants that it is and on the dates of consummation will be fully entitled to assign and transfer to RUAN the operating authorities and equipment set forth in the Appendices A and B hereto, and that said authorities, equipment to be transferred herein at the dates of consummation will be free and clear of all liens and encumbrances of every kind and description.

15. Cancellation. In the event the Commission not grant the conversion of WAGGONER'S contract permit to a common carrier certificate or either the Commission or the authorized regulatory agencies restrict the authorities in any substantial manner unsatisfactory to RUAN, it may, at its option, declare the purchase agreement, as it relates to authority and real estate, null and void and cancel the lease of authority and real estate upon giving ten (10) dys notice to WAGGONER.

16. Assignability. This Agreement or any portion thereof may be assigned by RUAN without the prior written consent of or notice to WAGGONER provided RUAN will remain liable for satisfaction of any of the terms of this agreement. WAGGONER has the right to cancel this agreement should the final order or judgment be in a manner unsatisfactory to RUAN and no assignment is made within sixty (60) days of the effective date of said final order or judgment.

17. Notices. Notices from one party to another shall be in writing and shall be mailed by certified mail, return receipt requested.

IN WITNESS WHEREOF, RUAN and WAGGONER have caused these presents to be duly executed by their respective appropriate officers hereunto duly authorized and their corporate seals affixed hereunto by their secretaries, all on the day first above written.

RUAN TRANSPORT CORPORATION

By _____
John Ruan, President

SEAL

Attest:

_____
Assistant Secretary

HAROLD WAGGONER AND COMPANY

By _____
Harold Waggoner
President

SEAL

Attest:

Della Schmidt
Secretary

*

IRREGULAR ROUTES:

Liquid chemicals, in bulk, in tank vehicles (except liquid chemicals as described in Appendix XIII to the report in Descriptions in Motor Carrier Certificates, 61 M.C.C. 209),

From St. Louis, Mo., and East St. Louis, Ill., to points in Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Mississippi, New York, Ohio, Oklahoma, Tennessee, and Texas, with no transportation for compensation on return except as otherwise authorized.

Acids, and liquid chemicals, in bulk, in tank vehicles,

From St. Louis, Mo., and East St. Louis, Ill., to points in Maryland, with no transportation for compensation on return except as otherwise authorized.

SUB 5

IRREGULAR ROUTES:

Liquid chemicals, in bulk, in tank vehicles,

From St. Louis, Mo., and East St. Louis, Ill., to points in Alabama, Arkansas, Connecticut, Delaware, Louisiana, Massachusetts, Nebraska, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Vermont, West Virginia, Wisconsin, and that part of Maine south of a line beginning at the Maine-New Hampshire State line and extending along U. S. Highway 2 to Bangor, Maine, thence along Maine Highway 9 to the United States-Canada Boundary line, (restricted against the transportation of maleic anhydride from St. Louis, Mo., and East St. Louis, Ill., to points in Connecticut, Delaware, Massachusetts, New Jersey, Pennsylvania, Rhode Island, and West Virginia), with no transportation for compensation on return except as otherwise authorized.

RESTRICTION: The operations authorized herein are limited to a transportation service to be performed, under a continuing contract, or contracts, with **Monsanto Chemical Company.**

SUB 6

IRREGULAR ROUTES:

Pentachlorophenol, in bulk, in tank vehicles,

From St. Louis, Mo., and East St. Louis, Ill., to points in Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New York (except points in Kings, Queens, Nassau, and Suffolk Counties), Pennsylvania, Ohio, Oklahoma, Texas, Wisconsin, and points in that part of Tennessee west of U. S. Highway

27, with no transportation for compensation on return except as otherwise authorized.

RESTRICTION: The operations authorized herein are limited to a transportation service to be performed, under a continuing contract, or contracts, with the following shippers:

Wood Treating Chemicals Company, St. Louis, Mo.,
Associated Sales and Supply Company, St. Louis, Mo.

MISSOURI INTRASTATE

Liquid Commodities, except petroleum and petroleum products and liquified petroleum gas and anhydrous ammonia, in bulk, in tank vehicle, via irregular routes,

In the Commercial Zone of St. Louis, Missouri, as defined by Section 390.111, sub-section 14, RSMo. 1959, as amended, or as defined by the Commission.

ILLINOIS INTRASTATE

Common: Ill. C. C. 9952 MC-CPR

Coal, cinders, rock and sand to or from any point or points within the State of Illinois.

Contract: Ill. C. C. 9952 MC-CPR

Commodities set forth in and pursuant to bilateral written contracts, filed or to be filed with the Illinois Commerce Commission, concerning the transportation of Chemicals in bulk in tank vehicles from East St. Louis, Illinois to and from points and places in Illinois.

TRACTORS INCLUDING LICENSES

NO.	YEAR	MAKE	VALUE
144	1969	GMC	$ 2,700
No #	1970	IHC	1,300
174	1973	REO	14,500
168	1973	REO	15,500
172	1965	Ford	1,000
170	1964	Ford	900
166	1973	Ford	13,000
164	1969	WFT	6,500
162	1969	WFT	6,500
170	1972	GMC	7,500
156	1970	IHC	6,600
148	1969	Ford	3,500
152	1969	Ford	3,500
146	1969	IHC	5,500

TRAILERS INCLUDING LICENSES

NO.	YEAR	MAKE	VALUE	NO.	YEAR	MAKE	VALUE
45	1957	Frue.	$1,250	153	1968	ACRO	$ **
53	1958	Frue.	1,500	155	1968	ACRO	**
83	1961	Frue.	1,500	157	1968	ACRO	**
85	1962	Progress	2,000	159	1970	Frue.	**
87	1962	Progress	2,000	165	1961	Frue.	3,000
89	1962	Frue.	2,700	167	1964	Frue.	3,700
103	1963	Frue.	1,750	169	1970	ACRO	8,320
111	1964	Standard	**	171		ETNYRE	1,000
113	1964	Standard	**	173	1954	Frue.	500
115	1964	Standard	**	175	1959	Joplin	500
117	1964	Standard	**	177	1961	Frue.	1,320
119	1964	Standard	**	179	1961	Heil	2,700
121	1964	Standard	**	181	1958	Standard	2,400
123	1964	Standard	**	183	1970	Heil	7,140
125	1964	Standard	**	185	1973	T.M.	**
127	1964	Standard	**	187	1973	T.M.	**
129	1964	Standard	**	189	1961	Frue.	1,500
133	1966	ACRO	3,700	191	1961	Frue.	1,500

** Units Not for Sale

OTHER

All service, shop and office equipment, furniture, fixtures and tools operated by HAROLD WAGGONER AND COMPANY whether or not listed on the companies books and records.

DESCRIPTION OF LAND AND BUILDINGS

Address:

1300 Quincy Avenue
Cahokia, Illinois

Area:

Approximately 21.36 acres

Buildings:

Office and terminal--approximately 70' by 100'
House trailer.

Exhibit 48

RICHARD B. OGILVIE
Governor

WILLIAM L. BLASER
DIRECTOR

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY

REF 59

August 6, 1971

ST. CLAIR COUNTY -- Cahokia - Sauget
Harold Waggoner & Co.
Chemical Discharge

REPLY TO:

SOUTH CENTRAL REGIONAL OFFICE II
ENVIRONMENTAL PROTECTION AGENCY
117 WEST MAIN STREET
COLLINSVILLE, ILLINOIS 62234

Harold Waggoner & Co.
1300 Queeny Avenue
Sauget, Illinois

Gentlemen:

On April 8, 1971, and July 28, 1971, technical representatives of this Agency made an inspection of your property and noted the following deficiency:

> Tanker trucks labeled as corrosive were observed to be apparently discharging their contents to Dead Creek and causing a pollutional condition therein.

You are hereby directed to immediately eliminate any additional discharges to waters of the State. You are also directed to notify this Agency as to the steps taken to abate the discharge.

Failure to comply with above directive will lead to referral to our Division of Legal Services for the purpose of seeking appropriate legal action.

Very truly yours,

ENVIRONMENTAL PROTECTION AGENCY

R. L. Schleuger, Supervisor
Mississippi Basin
Surveillance Section

RLS/at

cc: DWPC
Mississippi Basin ✓
Mr. Roscoe Easteridge
Mr. Joseph S. L. Vigni

M E M O R A N D U M

ST. CLAIR COUNTY - Harold Waggoner & Co.
(Sauget) Tanker Truck Wastes

REF 60

TO: Division of Water Pollution Control, Surveillance Section

FROM: Michael G. Neumann, Engineer, Mississippi Direct Sub-Unit

DATE: February 13 and March 22, 1973

INTERVIEWED: Harold Waggoner, Owner

On the above dates, the writer visited the Harold Waggoner & Company, Chemical Transporters. Agency personnel had previously observed the trucking company discharging the contents of its tanker trucks to an adjacent body of water appropriately named Dead Creek. An Agency letter notified the company of the discharge and a reply was received that the discharge to Dead Creek had been eliminated.

The owner of the trucking company, Mr. Harold Waggoner, was contacted at his office. Mr. Waggoner stated that a hole had been dug nearby into which the tanker truck washwater discharged. Mr. Waggoner stated that there was no danger of the facility overflowing. The writer explained various State laws and regulation governing discharges and treatment facilities. The writer inspected the hole which was located about 100 yards behind the trucking company's office. The hole was roughly circular, about 30' in diameter, with an unknown depth. Its surface was covered with oil. The hole was not surrounded by a fence nor were warning signs posted. The company did not obtain a permit for construction. About 100 gpd are used to wash out two tank trucks which are used to transport industrial acids. Since the tank trucks are loaded and unloaded under pressure, Mr. Waggoner did not believe that there was any acid left in the trucks when they are washed out. Mr. Waggoner attributed the oil in the hole to the leaking of several barrels that had been placed in or near the hole. The barrels had been discarded on the property several years previous.

A subsequent check with the Permit Section revealed that since only 100 gpd are discharged to the facility, there was little acid waste contained in the washwater and there was no overflow, a permit would probably not be needed, although the situation was a somewhat gray area.

Surveillance of the facility will continue to determine if the situation changes.

MGN/cas
4/11/73

cc: Mississippi Basin

Exhibit 49

EXHIBIT NO. 15
RUAN TRANSPORT CORPORATION
-PURCHASE-
HAROLD WAGGONER & COMPANY
DOCKET MC-F-12207
MC 107496 SUB 951

INTERSTATE SHIPMENTS BY HAROLD WAGGONER & COMPANY

FOR PERIOD BEGINNING 1-2-73 AND ENDING 3-19-74

LISTED ACCORDING TO DESTINATION CITY AND STATE

007633

Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Missouri, Mississippi, New Jersey, New York, Ohio, Tennessee, Texas, and West Virginia.

Support for the applications was offered by five of eight shippers of chemicals participating in transportation contracts with Waggoner.

Proctor and Gamble Company has facilities throughout the world, including one in St. Louis. The company produces soaps, detergents, shortenings, edible products, household cleaning products and industrial chemicals. The St. Louis plant produces fatty acids of various types, palmsoy, and tallow, which are transported in bulk, both by rail and motor carrier, of which approximately 65 percent is shipped by motor carrier. It has used the services of Waggoner and Rogers. It ships approximately 200,000 pounds of chemicals per month by Waggoner destined to points in Iowa, Illinois, Ohio, Missouri, Tennessee, Kentucky, Pennsylvania, Minnesota, and New Jersey. It supports the retention of the existing authority on a statewide basis in order to avoid a lessening of available carrier service. It does not matter to the shipper whether a carrier that it utilizes holds contract or common carrier authority.

Agrico Chemical Company manufactures and markets agricultural chemicals and fertilizers in all States east of the Rocky Mountains. Agrico has had a contract with Waggoner since 1968. It has used Ruan elsewhere and has been satisfied with the service. Its interest is to see that the available service remains in existence.

Allied Chemical Corporation has had a contract with Waggoner for over 10 years. It has used Ruan's services elsewhere for shipments of chemicals. The company is the sixth largest chemical producer in the United States. It has a plant at East St. Louis which manufactures liquid and dry aluminum sulfate. The liquid product moves entirely in bulk, in tank vehicles, and the dry products moves in bulk and in packages. This product is sold to municipalities and paper manufacturers throughout the United States. The East St. Louis plant ships approximately 20,000 tons annually via motor carrier, utilizing private and common carriage. In 1973, it used Waggoner primarily to Kansas. It has not used Waggoner since the latter part of 1973. Waggoner's broad destination authority is of value because the shipper is offering bids which would affect the growth of the East St. Louis plant. The type of authority the carrier holds, whether contract or common, is not of importance to Allied. It switched to Klipsch when Waggoner ran into labor difficulties. It supports this application because in the past it has had at least two or three carriers and wants that service to continue to be available.

Wood Treating Chemicals Company, a division of Koppers Co., Inc., operates a plant in St. Louis. It produces liquid wood preservatives derived from pentachlorophenol and an oil base. The product is used

PRODUCT MOVEMENTS

	1-1-73 thru 3-19-74	6-3-74 to Present
1. Cooper	2 loads to Texas	1 load to New Jersey
2. Allied	9 loads to McPherson, Kans.	
3. Glidden	22 loads to Tupelo, Miss.	14 loads to Tupelo, Miss.
4. Parker	2 loads to Newton, Ia.	6 loads to Iowa and Alabama
5. Proctor & Gamble	62 loads to Ohio, Illinois and Iowa	
6. Koppers	100 loads to Iowa, Illinois, Indiana, Kansas, Ohio, Tennessee	
7. Monsanto	538 loads	

Exhibit 50

RUAN
TRANSPORT
CORPORATION

November 3, 1994

3200 RUAN CENTER
666 GRAND AVENUE
DES MOINES, IOWA
50309
515-245-2500

Marsha A. Adams
5HSM-5J, Responsible Party
Search Section
U.S.Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3590

RECEIVED
NOV 9 1994
SUPERFUND PROGRAM
MANAGEMENT BRANCH

Re: 104 (e) Request for Sauget Area 1

Dear Ms. Adams:

In the future please direct all correspondence to the following address:

Kenneth L. Kessler
Director of Legal Services
Ruan Transport Corporation
P.O. Box 855
Des Moines, IA 50304

Attached are Ruan Transport Corporation's responses to the 104(e) request. They are based on information currently available. Additional investigations are being made and this information will be supplemented if anything is found.

Yours truly,

RUAN TRANSPORT CORPORATION

Kenneth L. Kessler
Director of Legal Services

pb

Attachment

AFFIDAVIT

I, Kenneth L. Kessler, Director of Legal Services for Ruan Transport Corporation, having been duly sworn, hereby state:

1. I am the person authorized by Ruan Transport Corporation to respond to the 104(e) Request to which this is attached.

2. I have made a complete and thorough review of all documents, information, and sources relevant to the Request.

3. I hereby certify that the Response to which this is attached is complete and contains all information and documents responsive to the Request to the best of my knowledge and belief.

Dated this 3rd day of November, 1994.

Kenneth L. Kessler
Director of Legal Services

Subscribed and sworn to before me this 3rd day of November, 1994.

Notary Public

RUAN TRANSPORT CORPORATION'S
RESPONSES TO
104 (e) REQUEST - SAUGET AREA 1

1. Persons consulted in the preparation of the answers.
   Mike Smith, Director of Environmental Affairs
   Susan Wilson, Properties Manager
   LaVerne Milbrandt, Treasurer
   Bill Giles, VP Research & Engineering
   Mike Mefford, Division Sales Manager
   Kenneth Kessler, Director of Legal Services
   Lee VerSteegh, Controller

   All of the above are Ruan Transport Corporation employees in Des Moines, IA.

2. Identification of documents consulted.

   They are attached to the specific responses to the following questions or are attached and identified by tab 2.

3. Others who may have information.
   Cerro Copper Products Co., St. Louis, MO
   Monsanto Company, St. Louis, MO
   Midwest Rubber Reclaiming Division of Empire Chem., Inc., Binghamton, NY
   Illinois Environmental Protection Agency, Springfield, IL
   Metro Construction Company, 1300 Queeny Ave., Cahokia, IL
   John Lorentzen, 2218 Mousett, Cahokia, IL
   Harold Schmidt, 1300 1/2 Queeny, East St. Louis, IL
   Harold Waggoner and Waggoner & Company, Collinsville, IL
   Others as identified in the attached documents.

4. EPA Identification Numbers:
   Ruan Transport Corporation was not issued an EPA Identification number for its site at Queeny and Falling Springs Road.

5. Identify all persons with knowledge or information about generation, transportation, disposal at the Site.
   Mike Mefford, Division Sales Manager, for Ruan Transport Corporation, and others identified in response to the specific requests listed herein.

6. Identify the acts or omissions of others relating to the release of hazardous substances, etc.
   See attached letter identified as number 6.

Exhibit 51

FAGEL & HABER
ATTORNEYS AND COUNSELORS AT LAW
ESTABLISHED 1962
140 SOUTH DEARBORN STREET, 14TH FLOOR
CHICAGO, IL 60603 · (312) 346-7500
FAX (312) 580-2201 · CABLE NOFLAWLAW · TELEX 754542

ALLEN J. FAGEL
JOEL A. HABER
FLOYD BABBITT
ALVIN D. MEYERS
DENNIS E. QUAID
GLEN T. KEYSOR
STEVEN J. TEPLINSKY
WALTER D. CUPKOVIC
SHERWIN M. LESK
JOHN J. CULLERTON
RICHARD H. CHAPMAN
JASON W. LEVIN
ROBERT B. CHAPMAN
JAMES R. LATTA
HOWARD M. BERRINGTON
JUDITH JOYCE SHANAHAN
DONALD J. VOCEL
NORTON N. GOLD
JAMES B. GOTTLIEB
GINA M. CENTILL
SHERYL COHEN ALLENSON
WILLIAM P. ANDREWS
J. PAUL BERTSCHE
DANIEL C. COMAN
PATRICK J. CULLERTON
JOHN S. DELNERO
VICTOR A. DES LAURIER
JAMES M. DRAKE
ILYSE D. DUNKEL
THOMAS B. GOLZ
SCOTT C. HAUGH
MICHAEL J. KEATON
LAWRENCE T. KRULEWICH
LAURA A. O'NEILL
SARA L. THOMAS
DOUGLAS B. WOLK
MELINDA MORRIS ZANONI

OF COUNSEL
LEONARD R. KOFKIN
MAYNARD B. RUSSELL

BY CERTIFIED MAIL
RETURN RECEIPT REQUESTED

November 29, 1994

Ms. Marsha A. Adams, 5HSM-5J
United States Environmental
Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

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SUPERFUND PROGRAM
MANAGEMENT BRANCH

WRITER'S DIRECT DIAL NO.
(312) 580-2244

RE: Response to Request for Information Pursuant to Section 104(e) of CERCLA
Sauget Area 1, Sauget, Illinois
Rogers Cartage Company
Our File No.: 26947-020

Dear Ms. Adams:

Enclosed please find our client's response to Mr. Mateer's undated request and your supplement of October 26, 1994 to that request. The supplement, received October 31, 1994, was necessary in preparation of the response.

Thank you for your cooperation in this matter.

Very truly yours,

Thomas B. Golz

Enclosure

RESPONSE TO REQUEST FOR INFORMATION PURSUANT TO SECTION 104(e) OF CERCLA FOR SAUGET AREA 1, SAUGET, ILLINOIS RECEIVED OCTOBER 7, 1994 AND REVISED OCTOBER 26, 1994

1. Paul Hinds, Vice President, Rogers Cartage Company.
   Allyn Konrad, Terminal Manager, Rogers Cartage Company, Sauget, Illinois

2. 1990 responses to Illinois Environmental Protection Agency inquiries regarding Sauget Areas 1 and 2, copy enclosed as exhibit A.

3. None.

4. ILD006932438, Rogers Cartage Company, Sauget, Illinois.

5. Rogers Cartage Company conducted no hazardous waste or hazardous materials activities at the Site.

6. No information. See 5 above.

7. Rogers Cartage Company is a common carrier, delivering liquid product cargoes from shipper to end user. Rogers Cartage Company's Falling Springs/Avenue/Nickel Street, Sauget, Illinois establishment is **a tank truck terminal established on** or about 1970. Before 1970, Rogers did not have a terminal in Sauget. Tanker trailers returning to the terminal after deliveries are RCRA empty, with all residues removeable by normal means drained at the consignee facility. **Tanker trailers are water and detergent solution rinsed, with the rinsate discharged** to the POTW.
   The only circumstance where a cargo would be transported to the Rogers' facility for a brief period would be to change cab, change driver, or coordinate delivery to the consignee.

8. No information.

9. No information.

10. See Exhibit A for listing of common cargo chemicals. No on site disposal was or is conducted, and tank cleaning is and was conducted by Rogers personnel. See 7 above.

11. No wastes accepted at Rogers' facility.

12. See 11 above.

13. a) No.
    b) No.
    c) No.

FAGEL & HABER
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CHICAGO, IL 60603 · (312) 346-7500
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OF COUNSEL
LEONARD R. KOFKIN
MAYNARD B. RUSSELL

BY CERTIFIED MAIL
RETURN RECEIPT REQUESTED

November 29, 1994

Ms. Marsha A. Adams, 5HSM-5J
United States Environmental
Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

RECEIVED
DEC 02 1994
SUPERFUND PROGRAM
MANAGEMENT BRANCH

WRITER'S DIRECT DIAL NO.
(312) 580-2244

RE: Response to Request for Information Pursuant to Section 104(e) of CERCLA
Sauget Area 1, Sauget, Illinois
Rogers Cartage Company
Our File No.: 26947-020

Dear Ms. Adams:

Enclosed please find our client's response to Mr. Mateer's undated request and your supplement of October 26, 1994 to that request. The supplement, received October 31, 1994, was necessary in preparation of the response.

Thank you for your cooperation in this matter.

Very truly yours,

Thomas B. Golz

Enclosure

14. No. This property had been acquired for the construction of a new terminal, but the new terminal was never built at that site, and Rogers conducted no activity at sites H and I.

15. No information.

16. No.

17. See 7 above.

18. Rogers Cartage Company is a common carrier, delivering liquid chemical products cargoes on behalf of various shippers to their consignees. While Rogers Cartage Company has made cargo deliveries to Sauget/Cahokia area facilities, in the absence of street address information or name information for the designated sites within Area 1, we can not determine whether any of the consignee locations are wthin the area designated as Sauget Area 1 Site.

AFFIDAVIT

STATE OF ILLINOIS

COUNTY OF COOK

Paul Hinds on oath deposes and says that:

1. I am the Vice President Rogers Cartage Company. I have been employed by Rogers Cartage Company since 1950, and have been employed in an executive capacity by Rogers Cartage Company since 1955.

2. I have reviewed U.S. EPA's Request for Information Pursuant to Section 104(e) of CERCLA for Sauget Area 1, Sauget, Illinois (the "Site"). I have reviewed available records and consulted other Rogers personnel seeking relevant information regarding the Information Request, and provide the attached response based upon my review.

FURTHER AFFIANT SAYETH NOT.

Paul Hinds, Vice President
Rogers Cartage Company

Subscribed to and sworn before me this 8th day of November, 1994.

Mary Holmes
Notary Public

"OFFICIAL SEAL"
Mary Holmes
Notary Public, State of Illinois
My Commission Expires 12/19/97

February 27, 1990

Mr. William C. Child, Manager
Illinois Environmental Protection
Agency
Division of Land Pollution Control
2200 Churchill Road
P. O. Box 19276
Springfield, IL 62794-9276

Re: L1630200005 St. Clair County
Sauget Sites Area II

Dear Mr. Child:

This letter is in response to your letter requesting information on our involvement with the above-mentioned site.

1. N/A

2. Our preliminary investigation has determined that our only involvement with this site has to do with our wastewater discharge to the Sauget Water Treatment Plant. This wastewater was generated from the internal cleaning of our tank trucks. To the best of my knowledge the following is a list of chemicals listed in Section 1004(6) of R.C.R.A. that have been cleaned at this site.

   Chlorobenzene, Chlorosulfonic Acid, Di Chlorobenzene, Dodecylbenzenesulfonic Acid, Hydrochloric Acid, Maleic Anhydride, Napthalene, Phosphoric Acid, Phosphorus Oxychloride, Phosphorus Trichloride, Sodium Hydroxide, Styrene Sulfuric Acid, Xylene, Zinc Choride and Zinc Sulfate.

3. We are unable to determine this.

4. N/A

5. N/A

6. All the analyses of our wastewater that I have are attached.

7. We are insured by the Travelers Companies. Attached is our Certificate of Insurance.

8. There is no formal agreement between Rogers and the Sauget P.O.T.W.

ROGERS CARTAGE CO.

4428 W. Midlothian Turnpike, Crestwood, Illinois 60445-1917 Telephone (708) 597-8700

February 27, 1990
Page 2

Mr. William C. Child, Manager
Illinois Environmental Protection
Agency
Springfield, IL 62794-9276

I certify that all information contained herein true and accurate to the best of my knowledge and belief.

Very truly yours,

David R. Kimbriel
Environmental Mgr.

:frg

Encs.

bcc: Mr. Tom Golz
Fagel, Haber & Maragos

ROGERS CARTAGE CO.

4428 W. Midlothian Turnpike, Crestwood, Illinois 60445-1917 Telephone (708) 597-8700

FAGEL & HABER
ATTORNEYS AND COUNSELORS AT LAW
140 SOUTH DEARBORN STREET
SUITE 1400
CHICAGO, ILLINOIS 60603

CERTIFIED

Z 745 092 581

MAIL

CHICAGO NOV 2 '94 ILL

U.S. POSTAGE 2.52

RETURN RECEIPT REQUESTED

Ms. Marsha A. Adams, 5HSM-5J
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Exhibit 52

Introduction

IN PRESENTING the East St Louis City Directory for the year 1930, the publishers desire to assure their patrons and the public that every effort has been made to produce a directory complete and accurate in every detail.

The Directory contains a CLASSIFIED BUYER'S GUIDE, an ALPHABETICAL LIST of all persons over 16 years of age, their occupation and home address, and in addition we have enumerated the number of children under 16 years of age, a STREET and AVENUE GUIDE, an up-to-date CITY MAP, individual directories of FAIRMONT, NATIONAL CITY and WASHINGTON PARK, together with a MISCELLANEOUS INFORMATION SECTION regarding your City, its Government, Churches, Organizations, Schools, Public Buildings, etc.

We have recently installed a DIRECTORY LIBRARY in the East St Louis Chamber of Commerce which contains directories of ILLINOIS, SURROUNDING STATES and of the NATION. We hope that you will refer often to these directories for both business and personal information. This library is kept up to date through the courtesy of the North American Directory Publishers of which we are members.

We thank you one and all for the patronage and information given in making this directory possible and hope you find this book of real service, both for business and private purposes.

Huber Directory Company

Compilers and Publishers

EAST ST. LOUIS

FAIRMONT
NATIONAL CITY
WASHINGTON PARK

DIRECTORY

-: 1930 :-

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OLIVE

Peoples Finance & Thrift Co. of East St. Louis
We loan money for any worthy purpose and you can repay us regularly in small amounts out of your income.
Call at our office and talk confidentially with us about it.
322 MISSOURI AVENUE EAST 5905 — E 5906

" Wm (Bertha) clk r 903 Trendley ave
Hagaman Mary arm winder r 1636 Cleve ave
Hagan Beatrice Miss switch bd opr St Mary's Hosp r same
" Gilbert (Beatrice) 2B 1G emp Al Ore Co r 2219 Gaty ave
" Hy (Mary) 1B 1G emp Ajax Co r 412 Converse ave
" Joe (Nellie) 1G emp Am Roofing Co r 1814 Ohio ave
" Roy (Olga) emp Monsanto r 2405 Miss ave
" Thos (Rose) 2B R R clk r 1824a Cleve ave
" Val lab r 509 N 44
Hagar Clay A (Mary) emp Big 4 Lunch Room r 822 N 8
Haggarty Catherine Y Miss r 1409 N 53
" Clarence A (Laura W) teller FIRST NATL BANK r 1409 N 53
" Conrad G (Katherine) 2B 5G supt R E Funston Co St L r 2027 N 21
" Geneva Miss tchr Manners Sch r 2027 N 21
" Jos (Lillian) carp r 1707 Ohio ave
" Louise tchr Morrison Sch r 2027 N 21
" Maurice carp r 1707 Ohio ave
" Merle Miss tchr 81st St Sch r 1707 Ohio
" Raymond A dentist 829 Murphy Bldg r K of C Club
Hagely Victor r 1917c State St
Hagen Albert farmer r 395 Bluff dr
" Almn Mrs r 852 N 38
" Benj fill sta 1029 Market ave r 1018 (re) Bond ave
" Clyde M (Viola) emp E St L Lt & P Co r 2902 Virginia pl
" Ella Miss steno Adams Stamp Co St L r 1407 Lynch ave
" Elmer r 1808 Belmont ave
" Emil (Cora) farmer r 395 Bluff dr
" Florence Mrs r 395 Bluff dr
" Isabel Miss r 127 Bluff dr
" Jos (Ella) lab r 1608 Belmont ave
" Jos A (Florence M) paymstr Am Zinc Co r 477 N 22
" Jos W (Mary Ellen) blksmith Term r 567 Alexander pl
" Laura Mrs r 1715 Frederick
" Lee R (Marie K) 2G load disp E St L Lt & P Co r 871 N 81
" Leo (Maria) emp Alfocorn Milig Co r 2405 Gaty ave
" Louise Miss r 127 Bluff dr
" Lucille Miss asst bkpr Standard Chev Co r 1407 Lynch ave
" Nick (Alina) mach Elliott F & S Wks r 852 N 38
" Raymond lab r 395 Bluff dr
" Rose Miss r 127 Bluff dr
" Stephen (Bertha) 1B 1G eng Al Ore Co r 528 N 82
" Victor (Annie) farmer r 127 Bluff dr
" Wm clk Wabash r 1715 Frederick
" Wm (Mayme) 3B coremkr Com Steel Co Gr City r 1407 Lynch ave
Hagen's Emma Dress Shop (Emma M Inge) 1803 State
Hagens Clarence emp Bell Tel Co r 500a S 6
" Ella Miss r 500a S 6
" Geo r 428 E Bdwy
" Jos emp M & O r 500a S 6
" Nick (Mary) 1G truck N P r 500a S 6
" Walter drug clk r 500a S 6
Hagenlocher Jno G (Etta) jr hy eng Ill Div of Hy r 2911 Bond ave
" Walter G emp E St L Lt & P Co r 2911 Bond ave
Hagensiiker Marie Miss beauty opr r 223 Pittsburg dr
Hager Gladys L Miss steno I C r 411 N 19 Apt 2
" Jno (Ella) shop I C r 411 N 19 Apt 2
Hages Louis (Cherry) 1B emp confr r 730 Bond ave
Haggard Clifton S (Mabel) switch Term r 219 Bluff dr
" Edw (Ella) switch I C r 417 Market ave
" Ethel Miss r 812 S 6
" Geo W (Celia) 1G emp C B & Q r 411 N 26
" Jess (Hester) 1B emp N S Y r 817 (re) Bowman ave
" Lola Miss steno Otis Elevator Co r 417 Market ave
" Marion (Sarah) emp C B & Q r 812 S 6
Haggarty Genevieve Miss steno Al Ore Co r 615 Converse ave
" Jas clk Tariff Bureau (S W) St L r 615 Converse ave
" Kath wid Jno 1G r 615 Converse ave
" Marcella A Miss ofc asst Dr Henry A Cables r 615 Converse ave
" Marian Miss bkpr Al Ore Co r 615 Converse ave
Haggerty Barth L clk So Ry r 440 N 21
" Daisy V wid Michael B r 440 N 21
" Monica G Miss steno r 440 N 21
" Oswald J clk r 440 N 21
Hagist Co The (Oscar Hagist) grocers and produce wholesale 311-15 N 9
" Oscar (The Hagist Co) r Mascoutah Ill
Haglar Geo L (Tillie) emp Term r 916 N 7
Hagler Delia wid Theo 1B r 825 St Clair ave
" Theo sta eng r 1829 Belmont ave
Hagnauer Leo C (Phila) hauling r 711 N 26
Hahesy Mamie Miss audt Fraser Audit Co r 742 Veronica ave
" Margt wid Thos r 742 Veronica ave
" Margt Miss steno Standard Sanitary Mfg Co r 742 Veronica ave
" Thos emp Turner Sup Co r 742 Veronica
Hahn Fred V (Mildred) 1B brake I C r 3034 Forest blvd
" Geo (Beulah) lab r 324 N 67
" Gordon G (Ola) 2B 2G mech r 718 Wabasha ave
" H J sls Natl Cash Register Co r St Louis Mo
" Jno (Johannah) blksmth Swifts r 1838 Parsons ave
" Jno (Margt M) stm fitr r 512 N 22
" Leroy J (Elsie) mech r 512 N 22
" Loretta Miss clk Price Mero Co St L r 2557 Natalie ave
" Payton (O) emp Swifts r 1743 College ave
" Rudolph (Matilda) 1B mach Armours r 1711 N 28
Hahne C F (Hahne-Ernst) r St Louis Mo
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" Jos M (Jennie) 1G gen'l bkpr SO ILL NATL BANK r 443 N 7
" Lucille Miss r 1132 St Louis ave
" Margt Miss steno M K & T r 1132 St Louis ave
Haggs Dora Mrs r 213 S Main
Hall Spencer R (Elenore) 1G chem Al Ore Co r 557 N 31
Haines Allen K (Erma) 2B emp St L r 417 N 8
" Andrew (c) 1B emp Am Steel Co r 4109 Market ave
" Ella wid Jimmie (c) r 4109 Market ave
" Morris sht mtl wkr Lang Sht Metl Wks r Edgemont Sta R R 4
" Obert J r 711 St Clair ave
" Sheet Metal Works (Wm M Haines) 711 St Clair ave
" Wm porter r 16 W Mo ave
" Wm M (Fonnie) 3B (Haines Sheet Metal Works) r 2557 Monroe ave
Hair Clara Mrs r 726 Baugh ave
Hairgrove Bert (Gladys) 1G oil pumper Dupo r 558 N 13
" Roy (Hilda) 2B 1G oil driller r 1103a Gaty ave
Hairston Velma Mrs (c) r 105 N 27
Haislip D R r 1418 N 43
" Sam K r 460 N 26
Haiste Chas (Maude) 1G lab r 1115 Lynch
Hajduk Jno J (Anna) 1G tailor 729 Colls ave r same
Halaj Anthony (Agnes) emp Swifts r 412 Bowman ave
Halasey F R (Marie) 2G elect eng r 827 N 82
Halbert Frank (Effie) (c) emp Al Ore Co r 2116 Kane ave
" M W chf inter insp St L-E St L Term Dist r St Louis Mo
" Margt Miss day clk New Drovers Hotel r 96-98 St Clair ave
Halbin Deryl emp Term r 1453 St Louis ave
" Lyman (Ora) emp L & N r 1453 St Louis
Hale Artie (Effie) 1G emp C & A r 2918 College ave
" Chas A (Lillian) car repr r 417 Bond ave
" Gertrude wid Saml r 1727 N 25
" Mary Miss r 1818 St Clair ave
" Max hlpr Standard Chev Co r 1727 N 25
" Milo W (Audra R) 1B 2G emp Al Ore Co r 561 N 31
" Ross A (Frances M) 2B 1G emp I C r 527 N 41
" Wm emp Cont Can Co r 1813 St Clair ave
Hales Jane wid Wm r 1856 Argonne dr
Haley Andrew (Edna) sls Armours r 2228 Bond ave
" Arthur (c) porter Byron's Barber Shop r St Louis Mo
" Benj (Helen) (c) 1B emp Al Ore Co r 1837 Gay ave
" Leonard W (Hattie) cond I C r 2538 Monroe ave
" Lucille r Beulah Club
" Margt De L Miss steno Illmo Hay & Grain Co r Beulah Club
" Prince (Augusta) (c) 1B lab r 108 N 24
Halliday Wm r Savoy Hotel
Halifax Fire Ins Co J Harry Clanahan agt 302 First Natl Bank Bldg
Haliisy Rhoda wid Richard emp Weiss Flower Shop r 1230a Gaty ave
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" Ada wid Wm (c) 1B r 1525 Baker ave
" Alphonso D emp Swifts St L r 4104 Caseyville ave
" Anna (c) r 504 S 19
" Archie P clk Eltringham Moving Co r 1122 Ill ave
" Austin H (Mabel) 2B 1G r 109 Exchange
" Barney (c) musician Pickett Orchestra r 2005 Mo ave
" Ben B (Lula) (c) barber 7 N 18 r 1225 Walnut ave
" Bennard (Minnie) (c) lab Al Ore Co r 1806 Market ave
" Byron A (Mary J) 1B clk r 1213 N 87
" Carlie R (c) pres Helmet Recreation Center Pool Hall r 1225 Walnut ave
" Carrie wid Albert (c) r 1222 Booker ave
" Chas emp N P r 919 (re) Winstanley ave
" Chas A (Sarah) barber St L r 714 (re) Winstanley ave
" Chas C chauf Cain-Hurley r 3760 Bond
" Columbia (c) chauf Edw Brown r 1125 N 8
" Cora L Mrs r 4104 Caseyville ave
" Craty Miss (c) r 814a (re) Winstanley
" Daisy Miss furn rms 16 W Mo ave r same
" Dallas (Vinia) (c) r 1810 Piggott ave
" David C (Ruby) painter r 401 N 82
" Drug Co (Thos V Hall) 5903 State
" Earl (Dorris) 1G emp B & O r 709 N 7
" Edw E (Opelia) emp Obear-Nester r 815 N 75
" Edw W emp N S Y r 558 N 25
" Elsie G Miss r 3142 Belleview ave
" Emery P (Effie) 2B 1G const supt Morgan & Homringhausen r 329 N 67
" Ethel (c) r 609 S 6
" Ethel B r 3219 Louisiana blvd
" Frances E Miss r 3760 Bond ave
" Frank T emp Term r 622 N 37
" Fred chauf W E Wheeler r 1207 State
" Fred (Lulu) (c) 1G lab r 1405 Trendley
" Fred (Mamie) (c) lab r 1526 Converse ave
" Freddie Mrs (c) r 510a N 3
" Guss (Vera) (c) 2B lab Al Ore Co r 1808 (re) Market ave
HALL H H general contractor 634-39 Murphy Bldg 234 Colls ave Phone B-6839 Long Dist 501 and pres H H Hall Constr Co r St Louis Mo
HALL H H CONSTRUCTION CO H H Hall pres. J F Davis treas. W K Mann sec, 634-39 Murphy Bldg 234 Colls ave Phone B-6839 (see right side lines and page 28)
" Helen Mrs (c) r 216 (re) N 3
" Hy (Lulu) (c) 1G emp Term r 615 S 6
" Jas (Hannah) 1B emp Obear-Nester r 1842a Mo ave
" Jesse asst treas Key Boiler Eqpt Co r St Louis Mo
" Lena Mrs waitr Quail Restr r 409a Colls

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SECTION 1—PRODUCTS AND PROCESSES ..... **Page 8**

Illinois manufacturing and processing establishments classified by products, including some other business organizations rendering services to manufacturers and business at large.

SECTION 2—GEOGRAPHICAL LISTINGS ..... **Page 409**

Illinois manufacturing and processing establishments listed by cities and towns, with executive personnel, products manufactured, number of employees and capitalization.

SECTION 3—ALPHABETICAL INDEX ..... **Page 1384**

Illinois manufacturers and processors by company name, showing cities and towns in which they may be located in geographical section.

MAP OF ILLINOIS AND POPULATION OF CITIES AND TOWNS ..... **Page 1469**

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IMPORTANT NOTICE: SEE PAGE 1473

EAST ST. LOUIS—*(continued)*

CHICAGO CURLED HAIR CO.
70 Lyon St.
Telephone—UPton 4-4984
Plant Mgr.—Harry Horwich
Product—Hair Processing (hog)
Employs at this plant—12
Home Office—see Chicago listing

CIRCLE PACKING CORP.
319 Winstanley Ave.
Telephone—UPton 5-2500
Pres. & Gen. Mgr.—Henry Kubicki
Vice-Pres.—John Skrabacz (inactive)
Secy., Office Mgr. Stanley Karmelita
Treas., Asst. Mgr.—John Malec
Sales Mgr.—Jos. Findo
Products—Meat & By-Products: Hams, Bacon, Sausage, Lard
Employs—50; Cap.—$100,000-$250,000.

CITY PRODUCTS CORPORATION
917 N. 13th St.
Telephone—BRidge 1-4654
Supt.—Max Dellison
Product—Ice
Home Office—Chicago, Ill.

COLCHESTER PROCESSING CO.
35th & Walnut Sts.
Telephone—BRidge 1-8321
Pres.—E. C. Andrews
Secy.—E. F. Dunmeyer
Product—Processing

CONTINENTAL CAN CO., INC.
National Stock Yards
Telephone—BRidge 1-5315
Manager—M. D. Sandine
Products—Cans (metal); Paper Containers; Bottle Caps; Cork, Paper & Plastic Products
Employs at this plant—750
Central Division Office—Chicago, Ill

CORN BELT LABORATORIES, INC.
215 Winstanley Ave.
Telephone—UPton 4-3333
Pres. & Gen. Mgr.—Dr. A. E. Bott
Exec. Vice-Pres.—Edw. S. Bott
Vice-Pres.—Dr. A. R. Bott
Secy.-Treas.—C. C. Juenger
Traf. Mgr.—Boyd Ungard
Pur. Agt.—C. Conder
Products—Hog Anti-Cholera Serums
Employs—20; Cap.—$200,000-$250,000.

DARLING & CO.
Mississippi Ave. & A & S RR.
Telephone—BRidge 1-3710
Manager—W. W. Reed
Product—Fertilizer
Employs at this plant—150 to 200
Home Office—Chicago, Ill.

EAST ST. LOUIS—*(continued)*

DeRANEK TOOL, DIE & MACHINE CO., J. P.
2762 N. 89th St.
Telephone—EXpress 7-1633
Owner & Gen. Mgr.—J. P. DeRanek
Shop Foreman—Paul Kintner
Products—Tools, Dies, Machine Wk.
Employs—2; Cap.—$25,000-$50,000

DIXIE MILLS CO.
10th & Walnut Sts.
Telephone—BRidge 1-2444
Pres.—Robert F. Deibel, Jr.
Asst. Secy.-Asst. Treas.—O. R. Wiebe
Asst. Secy.-Regl. Sales—W. H. Wilson
Asst. Secy.—J. G. Blight
Pur. Agt.—Keith Morrison
Traf. Mgr.—W. E. Temple
Plant Supt.—Herbert Rauscher
Products—Feeds (stock, poultry); Dog Food
Cap.—$1,000,000.

EAST ST. LOUIS ALFALFA MILLS
4802 St. Clair Ave.
Telephone—UPton 4-7006
Product—Feed

EAST ST. LOUIS AWNING CO.
1901 Ridge Ave.
Telephone—UPton 4-0954
Owner—Winifred Carten
Gen. Mgr.—Harry M. Lewis
Products—Canvas: Awnings, Covers
Employs—1 to 6 (seasonal)
Cap.—$10,000-$25,000.

EAST ST. LOUIS CASTINGS CO.
42nd & St. Clair Ave.
Telephone—BRidge 1-0510
Pres. & Gen. Mgr.—Ralph M. Hill
Vice-Pres. (Sales)—L. G. Farquhar, Jr.
Secy.—John H. Gain
Treas.—Charles G. Kurrus, Sr.
Pur. Agt.—Fred Huskey
Plant Mgr.—William Anderson
Chief Engr.—Everett Hart
Products—Castings (gray iron): Stove, Auto., Agric., Shoe Mchy., Misc.
Employs—250; Cap.—$500,000-$1,000,000

EAST ST. LOUIS JOURNAL
425 Missouri Ave.
Telephone—UPton 4-2500
Gen. Mgr.—P. H. Wire
Product—Printing: Newspaper

EAST ST. LOUIS PRESS
21 N. Main St.
Telephone—UPton 4-1133
Pres.—Glen A. Shepard
Secy.—Norman D. Shepard
Product—Printing: Newspaper
Employs—20

EAST ST. LOUIS—*(continued)*

EAST ST. LOUIS RENDERING CO.
Exchange Bldg., Nat'l Stock Yards
Telephone—BRidge 1-8190
Plant Mgr.—O. P. Yenerich
Product—Greases, Oils (inedible)
Employs at this plant—50
Home Office—see Success Mills, Chgo.
Pres.—Edward Morris
Vice-Pres.—W. M. Shirk
Cap.—$300,000-$500,000.

EAST ST. LOUIS STONE CO.
Murphy Bldg.
Telephone—UPton 4-7310
Pres. & Treas.—M. E. McLean
Secy.—Marie B. White
Sales Mgr.—Wm. E. Hewitt
Plant—R. R. No. 1 (Box 297)
Telephone—UPton 4-2670
Supt.—Joe Christopher
Products—Stone (crushed); Limestone
Employs—110; Cap.—$250,000-$500,000.

EMERSON ELECTRIC MFG. CO.
57th & Industrial Sts.
Telephone—BRidge 1-6060
Plant Mgr.—Ralph E. Knowles
Products—Aircraft Gun Turrets, Armament Eqpt., Radar Controls
Home Office—St. Louis 21, Mo.
8100 Florissant Ave.
Telephone—COlfax 1-1800
Chrm. of Brd.—W. S. Snead
Pres.—W. R. Persons
Vice-Pres., Treas.—R. E. Petering
Vice-Pres., Motors—R. E. Otto
Vice-Pres., Sales—Edw. L. O'Neill
Asst. VP, Ind. Rels.—G. F. Craig
Asst. VP, Engrg.—Wm. L. Davis, Jr.
Secy.—R. H. McRoberts
Adv. Mgr.—C. A. Swanlund
Cap.—over $1,000,000

EXCELSIOR TOOL & MACHINE CO.
3110 Ridge Ave.
Telephone—BRidge 1-7526
Pres.—O. S. Rudman
Secy.—H. A. Bobroff
Sales & Pur. Mgr.—P. J. Bann
Product—Sheet Metal Working Mchy.
Employs—40; Cap.—$250,000-$500,000.

FLANNERY & SONS, INC., P.
2105 State St.
Telephone—UPton 4-7700
Pres.—James P. Flannery, Sr.
Secy.—Vincent W. Flannery
Product—Concrete (ready mix)

FLANNERY BLDG. MATERIALS, V. H.
574 N. 20th St.
Telephone—BRidge 1-8329
Pres.—V. H. Flannery
Secy., Gen. Mgr.—Leo J. Hayes
Product—Concrete (ready mix)

EAST ST. LOUIS—*(continued)*

GEIGER PRINTING COMPANY
433 N. 5th St.
Telephone—BRidge 1-6668
Pres.—Alfred A. Geiger
Vice-Pres.—Marie M. Morrissey
Secy. & Treas.—Theresa Geiger
Office Mgr.—Fred G. Bauer
Products—Printing; Onetime Carbon
Employs—15; Cap.—$50,000-$100,000.

GENERAL BOX CO.
1101 Converse Ave.
Telephone—BRidge 1-6050
Vice-Pres. chg. Plant—Francis J. McCraw
Product—Boxes: Shipping
Employs at this plant—130
Home Office—Des Plaines, Ill.

GENERAL CHEMICAL DIVISION
Allied Chemical & Dye Corp.
N. 54th & Pa. R.R. Tracks
Telephone—BRidge 1-2430
Supt.—V. W. Long
Products—Chemicals; Acid (sulphuric)
(See Chicago, Ill.)

GOEDDE LUMBER COMPANY
2040 Illinois Ave.
Telephone—UPton 4-2789
Pres.—Edmund Goedde, Jr.
Secy.—Bernice R. Goedde
Product—Wood Millwork

HALE, H. H.
211 S. 15th St.
Telephone—BRidge 1-7471
Product—Concrete (ready-mix)

HILL BRICK CO.
Box 272, 51st & St. Clair
Telephone—BRidge 1-0754
Pres. & Gen. Mgr.—Frank E. Robison
Vice-Pres.—G. E. Robison
Vice-Pres., Secy.-Treas., Plant Mgr.—W. H. Huxel
Sales Mgr.—J. B. Drucke
Pur. Mgr.—W. J. Dunham
Traffic Mgr.—Mitchell Syzdek
Products—Brick, Tile (bldg., insulating)
Employs—77; Cap.—$100,000-$250,000.

HILL COMPANY, MAX L.
21 N. Seventh St.
Telephone—UPton 4-4501
Owner & Mgr.—Max L. Hill
Sales, Pur. Mgr.—Wm. F. Hill
Product—Printing, Binding (Job) & Die-cut Roll; Forms
Employs—35; Cap.—$100,000-$250,000.

HILL-THOMAS LIME & CEMENT CO.
2111 St. Louis Ave.
Telephone—BRidge 1-2480
Pres.—R. R. Thomas
Secy.—A. B. Haggeman

Exhibit 53

L1630200005/St. Clair County
H.H. Hall Excavation Pit
AKA Site M
ILD 984809251
Superfund/HRS

CERCLA

Preliminary Assessment Report

Illinois Environmental
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SECTION

SECTION 1

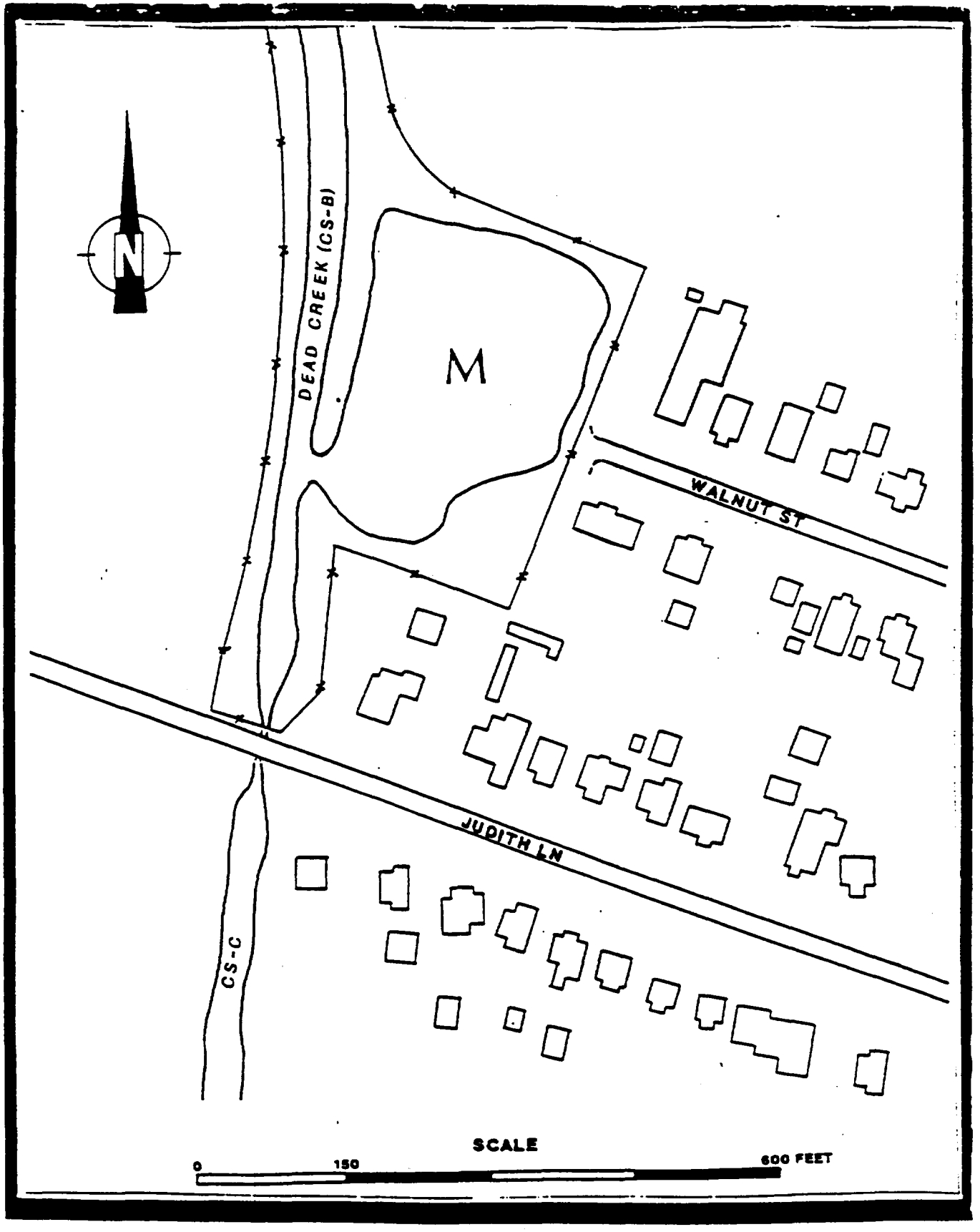
EXECUTIVE SUMMARY

Executive Summary

H.H. Hall Excavation Pit was placed on the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) on October 26, 1990, as a result of a request for discovery action initiated by the Illinois Environmental Protection Agency (IEPA). This action was taken as a result of alleged waste disposal practices at the site and the belief that excavation pit is one of many sites in Sauget (formerly Monsanto) and northern Cahokia, which has contributed to the degradation of environmental quality in this area.

H.H. Hall Excavation Pit is also known as Site M in IEPA file information. Therefore, H.H. Hall Excavation Pit will also be referred to as Site M for much of this report.

Site M is a former sand pit excavated by the H.H. Hall Construction Company in the mid- to late-1940's. It is located in Cahokia immediately east of Dead Creek and approximately 300 feet north of Judith Lane. The dimensions of the pit are approximately 275 feet by 350 feet, and its depth is estimated to be 40 feet. Presently, site M is filled with water although it remains unclear as to whether the water is a surface expression of the groundwater, or simply collected rainwater and drainage. Site M is depicted in the drawing on the following page.


N
DEAD CREEK (CS-B)
M
WALNUT ST
JUDITH LN
CS-C
SCALE
0
150
600 FEET

Site M is located in a residential area of northern Cahokia, just south of Sauget, Illinois. The closest residents live just east of the pit on Walnut Street. In the past, Walnut Street served as the access road to site, prior to the residential development. The site geographic location is within the southeast quarter of Section 26, Township 2 North, Range 10 West of the Third Principal Meridian in St. Clair County.

No information is available on file concerning waste disposal activities at Site M. It is possible that disposal did occur, since access to the pit remained unrestricted until a snow fence was erected in 1980. From review of historical aerial photographs, it is evident that minor changes in the dimensions of the pit have occurred. This could be an indication of filling around the perimeter of the pit. A 1950 aerial photograph is contained in Section 3 of this report. A Cahokia resident, Mr. Thomas Owen, is the current site owner.

IEPA and the Cahokia Health Department have received numerous complaints about Site M and the creek, from residents in the area. These complaints address, for the most part, seepage of odoriferous water into basements and problems associated with well water use.

IEPA sampled several wells in the area during the preliminary

hydrogeologic study conducted in 1980. In addition, a sample of basement seepage was collected from a home on Walnut Street near Site M. The results showed concentrations of copper, manganese and phosphorus above the state's water quality standards in one or more wells and in the basement seepage sample .

In conjunction with the creek sampling done in 1980, IEPA collected sediment and water samples from Site M. Although the water samples showed no significant contamination, the water quality standards for copper, phosphorous and zinc were exceeded and trace amounts of PCB's were detected in both samples. In the sediment samples, obvious contamination was observed. Fairly high levels of cadmium, chromium, copper, lead, nickel, zinc and PCB's were detected in the mud at Site M. Reference #1 contains the results of the well sampling, basement seepage, pit water and pit sediment samples from the Dead Creek study.

In 1985, IEPA contracted Ecology and Environment, Incorporated (E&E) to investigate 12 suspected uncontrolled hazardous waste sites and six segments of Dead Creek in Sauget and Cahokia. Site M was among the 12 sites with which a soil gas survey and samples of surface water sediments were collected. E&E also collected surface water and sediment samples from the adjacent creek as well as nearby groundwater samples from private wells. The results of the IEPA financed

investigation were used in the preparation of this report.

Six locations were tested for volatile soil gases at Site M. Only relatively low levels were identified. In the north central portion of the site and on the northeast side of the site, 18 milligrams per liter (mg/l) and 16 mg/l of volatile organics were detected respectively. Results of the soil gas tests, as well as the pit surface water and sediment samples, nearby Dead Creek surface water and sediment samples, and nearby private well samples are all included in Reference #2.

In the 2 surface water samples collected from the pit, the only organic compound detected was di-n-octyl phthalate found in both samples at an estimated 2 micrograms per liter (ug/l) and 4 ug/l. Heavy metals in the pit's surface water included elevated levels of barium, chromium, copper, iron, lead, nickel and zinc as compared with some of the Dead Creek surface water samples.

Three sediment samples were collected from the pit. The analytical results also indicated the presents of phthalate esters. Methyl ethyl ketone and PCB's were also detected in the sediment samples. The table on the following page summarizes the sediment sample results.

Summary of Sediment Sample Results for Site M

Chemical Name	Number of Detections	Highest Conc.	Sample with Highest Conc.
Volatiles			
2-butanone (MEK)	3	1400	SD-16
Semi-volatiles			
di-n-butyl phthalate	3	560J	SD-17
bis(2-ethylhexyl) phthalate	2	540J	SD-16
di-n-octyl phthalate	2	270J	SD-16
PCB's			
AROCLOR 1242	1	20000	SD-16
AROCLOR 1248	3	8830	SD-16
AROCLOR 1254	2	4200	SD-17
AROCLOR 1260	2	2700J	SD-17

Conc.-Concentration, J-estimated value, values in mg/kg (ppm)

Creek Segment B (CS-B) is the portion of Dead Creek which intermittently flows between Queeny Avenue and Judith Lane in Sauget and Cahokia. Site M is located adjacent to the end of this segment, on the east side of the creek. Nitroaniline, Aroclor 1260 (PCB) and elevated levels of cadmium, mercury, copper, barium, arsenic, chromium and lead were all detected in surface water samples of CS-B. The CS-B sediment samples found volatiles as well as greater numbers and concentrations of semi-volatiles near Site M.

Groundwater samples were collected from four private residences along Judith Lane, just south of Site M. Trace levels of organic contamination were detected in 3 of the 4

wells, and although the fourth well did not show organic contamination, elevated levels of arsenic, copper, lead, and mercury were detected in that well.

A CERCLA Preliminary Assessment site reconnaissance was conducted at Site M by IEPA on March 27, 1991. At this time, IEPA was also conducting a CERCLA Screening Site Inspection for Sauget Sites Area #1.

Site M appears as a nice small pond, although the east bank is strewn with miscellaneous trash and debris. Other than this material, no evidence of waste disposal was observed in the pit. Site M is connected to CS-B by a drainageway, or cut-through, about 8 feet wide, which allows flow between the creek and the pit. The pit receives surface run-off from the from the small residential area located east and south of the site. Excess water in the pit, drains through the cut-through located in the southwest corner.

Site M is located in an area known as the American Bottoms. Area well logs indicated the upper stratigraphy in this area consists of 70-120 feet of unconsolidated alluvium and glacial outwash overlying Mississippian aged limestone and sandstone formations (Ste. Genevieve and St. Louis Limestones). The valley fill deposits are composed of two formations, the uppermost being the Cahokia Alluvium followed by the Mackinaw Member of the Henry Formation.

Exhibit 54

The Story of Monsanto

Faith, Hope and $5,000

THE TRIALS AND TRIUMPHS
OF THE FIRST 75 YEARS

by Dan J. Forrestal

Simon and Schuster
New York

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began to realize that a whole new way of living—and dying—had become commonplace.

Of the 4,743,826 Americans who served their country and of the 315,000 U.S. casualties suffered between April 6, 1917, and November 11, 1918, when the Armistice was declared, Monsanto sent its share into service, many of whom would never return to what one soldier called "that sweet land of saccharin on the banks of the Mississippi River."

As in all wars, the devastation was incalculable, the adjustments beyond belief. Monsanto of 1917–1918 was only a minuscule, teen-aged cog in the industrial machinery of the nation. Yet Monsanto was destined to be shaken harshly into sudden maturity by the force of war-related events.

The company whose birth was dependent on a polysyllabic intermediate from Switzerland now found all of Europe, the "storage depot," closed down.

World War I forced the American industrial community to take a fresh look at its traditional "make or buy" decisions. The new imperative was to "make"—from the ground up, at home. Self-sufficiency became the cry of the land. *The New York Times*, in a forceful editorial, called upon the U.S. chemical industry to stand on its own feet (an earlier cry akin, it now seems, to today's clamor for less dependence on Mideast petroleum).

Edgar Queeny, looking back years later on the crunch that bore in on his father, remarked, "It was the first time Monsanto had to look all the way upstream in order to look downstream. Hard work and ingenuity were the only answers. There was no choice other than to improvise, to invent, and to find new ways of doing all the old things. The old dependence on Europe was, almost overnight, a thing of the past."

In sum: A company that had been beleaguered by incessant start-up woes, yet had been an industrial Horatio Alger in reaching its adolescent stage, was now confronted with an entirely new mix of imponderables. John F. Queeny, motivated by the double demands of profitability and patriotism, had just the right assessment of the predicament: a crisis. As it so happened, a slogan he had earlier borrowed for his company from his wife's family crest, *"in bello quies,"* was equally appropriate. Its meaning: "steadfast in strife" or, more literally, "calm in war."

The demands on Monsanto were overpowering. Old customers increased their orders. New customers sprang up like jacks-in-the-boxes. The Federal Government became a prime customer for the first time.

Concern on South Second Street centered on the availability of raw materials and intermediates for "making our own building blocks" and on rearranging processes so that available supplies from domestic sources could be employed. This called for new chemistry and new chemical engineering. In many cases, Monsanto knew all about the raw materials that were needed as the components of various intermediates

it had been purchasing. Yet there was a difference, Monsanto learned, between a chemical formula and a chemical process.

What Monsanto did not know were things like the precise mixtures, temperatures, pressures, catalysts, techniques and equipment for "stirring" raw materials into intermediates. And the gap had to be filled, one way or the other—and fast.

When Monsanto researchers went to technical libraries to dig deeper, it became clear that the Germans had: 1) anticipated the war, and 2) anticipated that American researchers would be storming the libraries in a scramble which a latter day journalist would call "a hectic game of catch-up football."

What did the Monsanto "detectives" find in the libraries? They found that pages of descriptions of German processes had been torn out of the books.

Something more subtle was also discovered. In those books where the pages had not been torn out, the Germans had quite frequently—and perhaps intentionally—been vague and misleading.

Yet, by and large, the battle of establishing new technology was won. How? "By working hard and even by making mistakes" was the explanation offered by Jules Bebie, the No. 3 Swiss import on John F. Queeny's team.

Phenol, which is, among other things, an effective antiseptic—and is also known as carbolic acid—was strongly in demand by the Surgeon General's office during the war period. It was used to maintain cleanliness in hospitals, camps and battlefield locations. A coal-tar product, it was a "best seller" for Monsanto from 1916 onward, and was destined to become a key product in the decades to follow, particularly in plastic resins.

The year 1917 brought with it another significant development—Monsanto's addition of acetylsalicylic acid, or aspirin, to its product catalogue. To be sure, no one at the time realized Monsanto would become the world's largest manufacturer of this early "wonder drug"—a distinction which still holds true today. Happily (for Monsanto) a U.S. patent protecting the Bayer Company of Germany expired in 1917. John F. Queeny leaped at this opportunity.

Phthalic anhydride, an intermediate, joined the list of the company's products in 1918. Here again was an item destined to be a longtime star on the stage of chemistry, particularly in plastics and plasticizers. However, Monsanto began making it because imports were cut off and because it was needed for phenolphthalein, an ingredient for laxatives.

In 1918, faced with the need for a deeper and broader market line and for expanded facilities to better accommodate the requirements of a war-fed American economy, Monsanto made a very large decision—the decision to be a more-than-one-factory company. The reach for a **second production unit** didn't require a very long arm. The reach was

simply directly across the mighty Mississippi to the Commercial Acid Company, just south of East St. Louis, Illinois, and a mile due east, as the crow flies across the water, from South Second Street in St. Louis.

Commercial Acid's principal products were sulfuric acid, zinc chloride, chlorosulfonic acid and salt cake, an impure form of sodium sulfate—new strengths to mix in with or add to Monsanto's requirements. Prior to this purchase, Monsanto's ranks stood at 288 employes. Commercial Acid added another 310.

To supervise operations "across the river," Monsanto hired Dr. Lloyd F. Nickell, an assistant professor of chemistry at Washington University in St. Louis—a man destined to advance to important positions for the company in the U.S. and in England. In turn, "Doc" Nickell, as he was called, brought with him a student, F. B. "Bert" Langreck, who was later to become a legendary "No. 1 chemical engineer" within the company's technical community.

"Profiteer" was an ugly word that raised its head during the World War I turmoil, referring to any businessman who took advantage of an unusual circumstance and put money into his own pocket without regard to the national interest or the long term consequences of his behavior.

A quote from Gaston DuBois sums up the Monsanto philosophy: "John F. Queeny could have sold saccharin in England during the war for $45 to $50 a pound. But he insisted on restricting its sale at 25 to 30 cents a pound to U.S. customers who had contracts." Queeny took care of his "regulars," as he called them, feeling that if he were loyal to them they'd repay that loyalty with continuing and increasing purchases.

Yet, understandably, the war did give Monsanto muscle, plus an unforgettable lesson that, again to quote DuBois, "the impossible is accomplishable." The year of the Armistice, 1918, showed Monsanto with sales of $9,450,000.

Financial growth was not the only reward for exemplary performance on the home front. From the U.S. War Department came a Certificate of Merit for the people of Monsanto, along with this citation:

"For their unceasing efforts, particularly in experiments in the manufacture of chemicals and drugs which had never before been made in this country, which were . . . of exceptional importance to the Government."

The crunch had not all been in vain.

It is insufficient to examine the Monsanto of the World War I period only in terms of products and growth. It was a digital company then, as now, of course. Survival is a digital exercise for all businesses.

But Monsanto was not (and is not) only digital. It was standard operating procedure to treat people as people, individuals as individuals. An observer in 1915 had commented on "the thing that separates and embellishes Monsanto—its respect for employes and its willingness to permit individuals to be individualistic, within the confines of teamwork and common goals, of course." Special care had been taken to welcome the Commercial Acid employes in 1918—so they'd not feel swallowed up by the headquarters operation of the company in "the big city across the river."

To better indicate the kind of organization Monsanto was during the war years, two small biographical inserts will help give the flavor of what it was like to work there in the company's second decade.

Victor E. Williams, eighty-two, lives an active and comfortable life in Garden City, New York. He retired as Monsanto's regional vice president in New York in 1962. He still gets together with some of his old cronies from the chemical industry. No alumnus alive can look back as far into Monsanto experience as Vic Williams. The story spins out best in his own words, as follows:

> When I was twenty years old, early in November, 1915, I wanted to be a ballplayer and my father wanted me to be an electrical engineer. Yet my path in life was actually determined by my mother's aunt, who, somehow, had met John F. Queeny and who had written a letter to Mr. Queeny in my behalf, explaining I was seeking employment. Mr. Queeny's response had been to the effect, "We're only a small company and I don't think we have anything for the young man, but ask him to come down for an interview and perhaps I can arrange for him to get a job at Meyer Brothers."
>
> On the fateful day of my appointment, I got off the Broadway streetcar at Lafayette Avenue and began to walk two blocks east to Monsanto. I didn't have to walk very far to encounter a most disagreeable aroma coming from the chemical plant. It was mostly from tea waste used in the early process of manufacturing caffeine. Well, I got halfway down and decided, "This is not for me." So I turned around and went back to Broadway, figuring the best thing to do under the circumstances was to catch a streetcar and head back home.
>
> While waiting for a northbound trolley, all of a sudden I said to myself, "What will I tell my mother?" This horrible thought prompted me to head back east on Lafayette and to enter a door of Monsanto with a request to see Mr. Queeny. Actually, I was hoping he'd not have a job at his smelly plant but would, instead, refer me to someone at Meyer Brothers, as his letter to my mother's aunt had indicated.
>
> His was the only private office in the place. When I was ushered in to meet him, the first thing he did was give me a piece of paper and ask me to write my name. This I did—in flowing penmanship—unaware as I was, at the time, that he put great emphasis on legibility of writing and that he, indeed, was quite justifiably proud of his own penmanship.
>
> Then he wrote down a series of multiplication tables on another sheet of paper and asked me to work them out. Little did he know that math had been my specialty in high school. I had enjoyed all forms of math, including calculus, and had even done some tutor-

witness to his superior's adroit salesmanship. Additionally, having been in on Monsanto's arrangements of bondage to lending institutions, he knew the day would come when Monsanto would have to reckon with paying back the loans.

The inevitability that such a day would dawn was not exclusively the worry of that "fox terrier of research," President Gaston DuBois. John Francis Queeny, an old poker player from the days of whisky and cigars at the Southern Hotel, also was fully cognizant of what it meant to toss an IOU type scrap of paper into the pot. He knew "settling up" was part of the game.

Monsanto's World War I growth had been fueled not only by sales and earnings increases, an acquisition (Commercial Acid), new products and new technology. It had also been fueled by fresh capital, which was needed to finance the progress. By 1920, Monsanto's postwar hangover involved a $3,200,000 debt—$1,200,000 to banks in direct loans, and $2,000,000 in corporate bonds purchased by institutions. Monsanto was defying the law of gravity by going upward at precisely the same time it was going downward.

This tug of war-era economics was, the records suggest, only partially anticipated by Queeny and his headquarters staff. Some war-inflicted aftermaths came as total shocks.

The best vantage point from which to examine this set of predicaments is 1920—shortly after the closeout of the war. Queeny was chairman and boss; DuBois was president and No. 2. Queeny was sixty; DuBois was only thirty-nine.

Later on, in 1960, John F.'s son, Edgar, was to philosophize that chief executive officers should step aside at sixty years of age and provide access for younger men to take over the burdens of corporate leadership. In 1920 Edgar's father, unquestionably fatigued by the strains of World War I, was faced with the enervating burdens of war's aftereffects.

Debt, scourge that it can be, was not his only problem. Other worrisome influences abounded to keep him from making debt a constant concern.

The whole supply-and-demand mechanism of the postwar years was seriously out of kilter, not just for Monsanto, but for the entire American industrial complex.

Much of the industrial apparatus mounted for war was promptly outmoded by peace. Most products that were all of a sudden urgently needed were in insufficient supply. More seriously, there was virtually unlimited supply of most products *not* urgently needed. Industrial inventories—accumulated when production had reached peaks—became "What'll we do with it all?" stockpiles—storage nightmares in themselves, distress merchandise awaiting shoppers.

Monsanto was not simply stuck with excess inventories. It found itself with a production capacity far exceeding postwar needs.

In short order—surprisingly short order—it found the Germans back

in business on some products, cutting prices. It found its costs up and its revenues down. Sales fell from $9,450,000 in 1918 to $8,432,698 in 1920.

When Edgar Queeny was asked in the early fifties to recount the Monsanto problem he best remembered, his answer was "The hard times of the early twenties."

But John F. Queeny was as adventurous as ever, hard times notwithstanding. He and Louis Veillon took a trip to England to scout there for idle war plants which might be available at bargain rates. During the course of the visit they met a man named Norman Graesser, who was president of a chemical company founded by his father, Robert Graesser, in 1867. The upshot of this meeting was Monsanto's 1920 purchase of one-half interest in R. Graesser, Limited.

Why? For one reason, the Graesser company was Great Britain's leading producer of phenol. For another, the same John F. Queeny who was adventurous enough to step across the Mississippi to acquire Commercial Acid was also adventurous enough to step across the Atlantic for a foothold in Europe. (Eight years later Monsanto was to acquire the remaining 50-percent interest of the British company and thus embark in earnest on its multinational pursuit.)

A classic irony of 1920 was this: While Monsanto was investing in a phenol-based company in North Wales, the U.S. was swimming in a postwar phenol surplus of 35 million pounds. Yet Monsanto later turned the latter situation to its advantage, serving as contractor for selling off the government's surplus at a commission.

The year 1921 was the real villain. That's when the postwar depression set in. By springtime the 1100-man working force at the plant on South Second Street—called Plant A—had been cut down to 25 people, and the **Commercial Acid facility across the river—called Plant B—was virtually shut down for a three-month period.** Struggling to hang on to its chemists, Monsanto gave some of them jobs as watchmen. In desperation, John F. Queeny sold a large portion of his stock and thus relinquished the majority control which had been so important to him.

Sales, which had been $8,432,698 in 1920, fell to $3,727,000 in 1921. Even more distressing, profits became losses.

Perhaps the most embarrassing episode of all came in 1923, when the big creditor, National City Bank of New York, sent in a "watchdog" named Beverly Harris and insisted he be given the title of president while overseeing the running of Monsanto. For the rest of his life, Harris—an easily provoked, stubborn but otherwise likable chap who had most certainly not solicited the six-month sit-in assignment—liked to tell the story about his tenure as "the most expensive flyswatter in the Midwest." He explained that John F. Queeny had taken the position, "If the bank insists we economize to get back on our feet, there are obviously no funds available to install a window screen in President Harris's office."

of profitability. In 1969 cyclamates were banned by the U.S. Food and Drug Administration as a possible health hazard, yet, ironically, the FDA subsequently indicated the ban was imposed on the basis of inconclusive evidence.

But the problem of an ubiquitous chemical called PCB became the most persistent of all.

In the company's 1970 Annual Report, it was stated: "Monsanto voluntarily undertook a program to reduce the presence of **polychlorinated biphenyl (PCB)** in the environment. The company withdrew PCB from the plasticizer market and introduced specially tailored replacements. Sales of PCB to the electrical industry (as a dielectric insulating fluid) were not affected because the product can be safely disposed of."

When the company announced in 1976 its intention to phase out the production of PCB, it explained:

> To fully comprehend the dilemma Monsanto had experienced as the sole producer in North America, it is necessary to understand the risks and benefits of PCB. The chemical structure of PCB has been known for almost 100 years. But it wasn't until 1929 that commercial production was initiated. This start-up was in response to the needs of the electrical industry for an improved dielectric fluid which would also provide increased fire resistance in transformers and capacitors.
>
> The only known alternative at that time was mineral oil. But it was very hazardous since it is unstable and flammable. The unique properties of PCB answered the special needs of the electrical industry by eliminating the threat of fires, explosions, equipment damage and personal injuries.
>
> For almost 40 years, PCB was used without any apparent problems. It wasn't until the late 1960s that the first signs of hazards began to surface.
>
> In 1968, almost 1,000 people in Japan became ill from eating rice contaminated with PCB as a result of an industrial accident. Symptoms of those eating the rice included dizziness, weakness and nausea. In addition, children born to mothers exposed during pregnancy had darkened skin at birth. In every case, however, the skin condition cleared within three months.
>
> An environmental problem was reported for the first time in the early sixties by a Swedish biologist, who identified PCB in the bodies of fish. Monsanto and others immediately began to study the Swedish work.
>
> When the study confirmed the presence of PCB in the U.S. environment, Monsanto began voluntarily withdrawing its sales of PCB to open application which could result in losses to the environment. This action reduced the company's annual PCB production from about 85 million pounds to less than 40 million. At the same time, Monsanto made the conscientious decision to continue supplying PCB to the electrical power distribution industry where it is used in sealed transformers and capacitors. Withdrawal from these applications would have halted production of equipment essential to the safe and efficient distribution of electrical energy, since no alternative was available.
>
> In 1972, Monsanto's restricted program was reviewed, supported and endorsed by a federal task force. But despite this endorsement, there were increasing reports that the entry of PCB into the environment had not been curbed.
>
> We were convinced that these reports were not evidence our program was not effective, but rather substantiated our theory that PCB remains in the environment for a long period of time. The findings of yet another task force, initiated in 1975, supported our theory that the majority of present quantities of PCB in the environment were the result of losses in past years.
>
> Monsanto had invested millions of dollars to implement and maintain its restrictive sales program, which we believe had been effective. And we have invested additional millions in our search for replacement dielectric fluids which would be more compatible with the environment.

Yet Monsanto was not content in the mid seventies simply to stick with a restricted sales program. It had many sessions with the Environmental Protection Agency and, of course, with its industrial customers using PCB. On October 5, 1976, Monsanto announced its intention to withdraw as a PCB supplier effective no later than October 31, 1977.

In 1969, realizing it had some proprietary technology which would help other industries combat pollution, the company formed a subsidiary, Monsanto Enviro-Chem Systems, Inc.

The new subsidiary's strength was more or less assured by its dowry of Monsanto's formidable technology in the design, engineering, construction and catalysts for sulfuric acid plants. More than 600 such plants have been established in 56 nations over the past 50 years. With such a solid and profitable base, Enviro-Chem was initially regarded as a sure winner. President Edward J. Bock in 1969 called it "our white hat."

The most notable success in Enviro-Chem's pollution control package has been the Brink mist eliminator, named for its Monsanto scientist-inventor, Dr. Joseph A. Brink. This device is designed to remove and collect virtually any liquid mist or soluble solid from any manufacturing gas stream with up to 99.95-percent efficiency on sub-micron particles.

The Brink technology was developed during the mid fifties and was successfully tested at Monsanto's phosphoric acid plant at Trenton, Michigan, starting in 1959. The first sale outside of Monsanto was accomplished in 1960 to Collier Carbon and Chemical Co., Wilmington, California. Brink elements have since been put into service in approximately 2000 installations in 54 countries.

The rest of Enviro-Chem has not done as well.

A process to remove sulfur dioxide from the stack gas of coal-fired

Exhibit 55

State of Illinois,)
County of St. Clair.) ss.

In the Circuit Court,
To the April Term, A.D. 1923.

John A. Russell,

-vs-

Monsanto Chemical Company,
a corporation.

C A S E .

John A. Russell, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company, a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was in possession, as tenant, of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> Lot One Hundred Ninety-eight (198), Third Subdivision Cahokia Commonfields; situated in the County of St. Clair and State of Illinois;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant, located north of the lands leased by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into it by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the defendant as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life, and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek, for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant, and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands leased by plaintiff during each and every year from March 29th, 1918, to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

Turner Holden & Bellington

Attorneys for Plaintiff.

State of Illinois,)
(ss.
County of St.Clair.)

In the Circuit Court,

To the April Term, A.D. 1923.

August Cange,

-vs-

Monsanto Chemical Company, a corporation.

C A S E .

August Cange, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company, a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was possessed of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> All that part of Lot numbered Two Hundred and Fifteen (215) of the "COMMONFIELDS OF CAHOKIA", lying between the Lower Cahokia Wagon Road and Cahokia Creek, containing Eighteen (18) acres, more or less, according to plat thereof of record in the Recorder's Office of St. Clair County, Illinois, situated in the County of St.Clair, in the State of Illinois;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from March 29, 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant, located north of the lands owned by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into it by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the defendant, as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps

through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life, and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek, for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands of the plaintiff during each and every year from March 29th, 1916 to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

[illegible]

Attorneys for Plaintiff.

State of Illinois,)
County of St. Clair.) ss.

In the Circuit Court,
To the April Term, A.D. 1923.

J. B. Pluff,
-vs-
Monsanto Chemical Company, a corporation.

C A S E .

J. B. Pluff, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company , a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was possessed of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> Lots numbered Two Hundred Five (205) and Two Hundred Six (206) of Cahokia Commonfields, St. Clair County, Illinois;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from March 29, 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant, located north of the lands owned by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into it by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the defendant, as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps

through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life, and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek, for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands of the plaintiff during each and every year from March 29th, 1918, to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

Turner Holder & Bullington

Attorneys for Plaintiff.

State of Illinois,)
County of St.Clair.) ss.

In the Circuit Court,
To the April Term, A.D. 1923.

Octave Levin,

-vs-

Monsanto ~~Chemical~~ Company,
a corporation.

C A S E .

Octave Levin, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company, a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was in possession, as tenant, of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> Lot One Hundred Ninety-nine (199), Third Subdivision Cahokia Commonfields; situated in the County of St. Clair and State of Illinois;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from March 29, 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant, located north of the lands leased by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the defendant as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life, and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek, for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant, and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands leased by plaintiff during each and every year from March 29th, 1918, to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

Purcell Holder & Bullington

Attorneys for Plaintiff.

State of Illinois,)
) ss.
County of St.Clair.)

In the Circuit Court,

To the April Term, A.D. 1923.

Lucien Godin, (
)
-vs- (C A S E.
)
Monsanto Chemical Company, (
a corporation.)

Lucien Godin, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company, a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was possessed of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> All that part of Lot numbered Two Hundred Thirteen (213), being part of Survey numbered Sixty-three (63), Cahokia Commonfields, lying Northwest of the Upper Cahokia Road, containing seven (7) acres, more or less, as per plat thereof of record in the Recorder's Office of St.Clair County, Illinois, in Book of Plats "E" on pages 16 and 17; except the right of way of the East St. Louis, Columbia and Waterloo Railway as now located and constructed upon and across said land, being all the land between the center line of said Railway and the East line of the Public Highway, commonly called the Lower Cahokia Road, also a strip of land Thirty (30) feet wide on the East side of and adjoining the center line of said Railway, as the same is now located upon and across said land, said right of way containing fifty-hundredths (.50) of an acre; situated in the County of St. Clair, in the State of Illinois;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from March 29, 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars, ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant, located north of the lands owned by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into it by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the de-

fendant, as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life, and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek, for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant, and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands of the plaintiff during each and every year from March 29th, 1918, to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

Turner Holder & Billington

Attorneys for Plaintiff.

State of Illinois,)
(ss
County of St.Clair.)

In the Circuit Court,
To the April Term, A.D. 1923.

Charles Nadeau,
-vs-
Monsanto Chemical Company, a corporation.

C A S E .

Charles Nadeau, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company, a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was in possession, as tenant, of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> West end of Survey 71 Cahokia Commonfields, St.Clair County, Illinois, extending from lower Cahokia Road to the bed of Old Cahokia Creek, containing sixteen (16) acres, more or less;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from March 29, 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant, located north of the lands leased by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into it by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the defendant as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life, and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek, for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant, and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands leased by plaintiff during each and every year from March 29th, 1918, to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

Turner, Holder & Bullington

Attorneys for Plaintiff.

State of Illinois,)
County of St.Clair.) ss.

In the Circuit Court,
To the April Term, A.D. 1923.

Narcise LaCroix,
-vs-
Monsanto Chemical Company,
a corporation.

C A SE

Narcise LaCroix, plaintiff, by Turner, Holder & Bullington, his attorneys, complains of Monsanto Chemical Company, a corporation, defendant, of a plea of trespass on the case.

For that whereas, on the 29th day of March, 1923, and for more than five (5) years immediately prior thereto, plaintiff was in possession, as tenant, of a certain tract of farm land in the County of St. Clair and State of Illinois, described as follows, to-wit:

> Lot One Hundred Ninety-five (195), Third Subdivision Cahokia Commonfields; situated in the County of St.Clair and State of Illinois;

and plaintiff, during said time, was engaged in farming said tract and raising various crops thereon, during each and every year from March 29 1918 to March 29, 1923, which crops were of great value, of to-wit: Five Thousand Dollars ($5,000.00).

And plaintiff avers that the defendant owns and operates a chemical plant located north of the lands leased by the plaintiff, and situated on Dead Creek; and in the operation of said plant, uses large quantities of water and chemicals, which are thrown into said Dead Creek. That said waters, being cast into Dead Creek as aforesaid, flow down its channel and along and upon the lands of plaintiff. That said waters are greatly in excess of that which would naturally flow in said Dead Creek and which are cast into it by the natural drainage of that locality; that by reason of the water thrown into said Dead Creek by the defendant as aforesaid, the level of said waters in Dead Creek is raised to a height of, to-wit, five (5) feet greater than it otherwise would be, and that by reason thereof the lands of plaintiff are overflowed, and by reason of the porous condition of the soil, the water seeps through the soil and fills depressions on the lands of plaintiff, which otherwise would be free and clear of water.

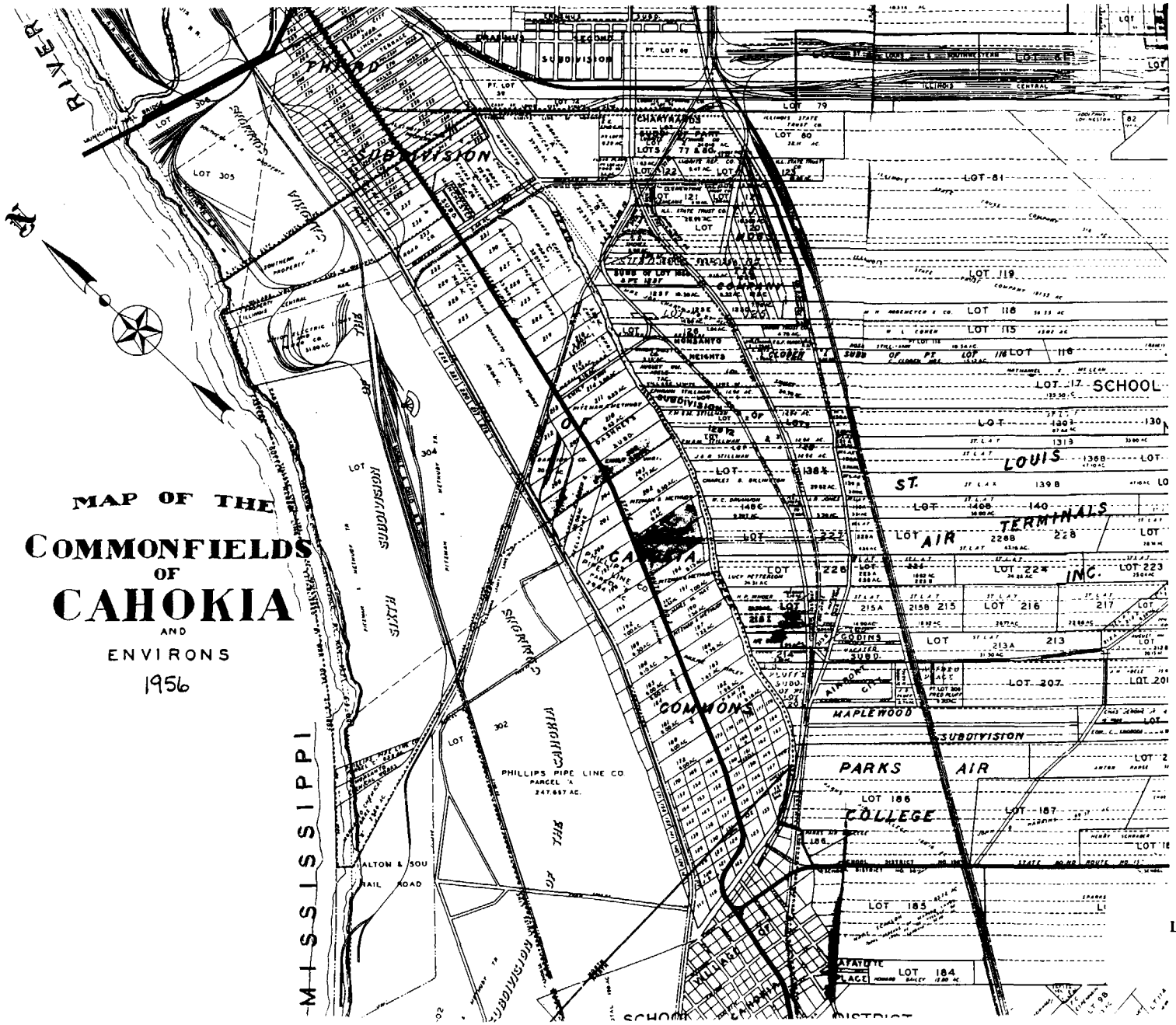
Plaintiff avers that by reason of said overflows and the seepage as above described, his lands are rendered unfit for cultivation and he is unable to plant his crops and till the same, and in cases where crops are planted and tilled, they are destroyed before harvesting, to the great damage of the plaintiff.

Plaintiff further avers that the waters thrown into Dead Creek as aforesaid, by the defendant, contain chemical substances which are destructive to plant life. and the water is rendered unfit for use by the plaintiff for stock and for the operation of machinery, and plaintiff is prevented from making use of the water in Dead Creek for any purposes whatever.

Plaintiff avers that it was the duty of the defendant to operate its said plant in such manner and by such means as not to injure and damage the property of plaintiff, and to provide adequate means for the disposal of its waste water, so as not to injure the property of plaintiff and deprive him of the use of the water in Dead Creek for watering his stock and to run his machinery; yet the defendant, nevertheless, in its operation of said plant, and wholly regardless of its duty in that behalf, wrongfully and injuriously caused waters in large quantities, containing chemical substances, to be cast upon the lands leased by plaintiff during each and every year from March 29th, 1918, to the present time; whereby and by means thereof, plaintiff has been greatly injured. To the damage of the said plaintiff in the sum of Two Thousand Dollars ($2,000.00); and therefore he brings his suit.

Turner, Holder & Bullington

Attorneys for Plaintiff.



Land affected by
1923 Lawsuits

Exhibit 56

NATIONAL POLE & TREATING COMPANY

(Controlled by Minnesota & Ontario Paper Co.)

History: Incorporated in Delaware, July 30, 1926, to acquire National Pole Co. and National Tie & Treating Co. Engaged in purchase, treating and distribution of forests products, principally cedar poles and ties for railroad use. Plants located at Minneapolis and Everett, Wash. with annual treating capacity of 400,000 poles and 1,500,000 ties. Branches located at Spokane, Wash. and Vancouver, B. C.

Management: OFFICERS: H. S. Gilkey, Chairman; S. W. Backus, Pres.; L. A. Furlong, F. G. Moore, G. H. Ramsey, Vice-Pres.; W. F. Brooks, Sec. and Treas., Minneapolis, Minn. DIRECTORS: E. W. Backus, S. W. Backus, W. F. Brooks, Frank Pendleton, H. S. Gilkey. ANNUAL MEETING: Sept. 27th. OFFICE: Minneapolis, Minn.

Consolidated Net Profits (available for interest, before depreciation and Federal taxes), years ended Dec. 31: 1923, $828,735; 1924, $529,280; 1925, $265,376; 1926 (nine months), $449,072.

Balance Sheet, as of Sept. 30, 1926 (giving effect to new financing): Preferred stock, $3,000,000; common stock (represented by 30,000 no par shares), $1; bonded debt, $2,000,000; accounts payable, $154,991; accrued liabilities, $81,455; total, $5,236,447. Contra: Plant and equipment, $964,447; real estate and stumpage, $77,800; patents, contracts, etc., $1; investments, $28,001; cash, $1,500,440; notes and accounts receivable, $300,210; inventories, $2,194,650; other assets, $65,246; deferred charges, $105,652; total, $5,236,447.

Funded Debt: 1. National Pole & Treating Co. 6% gold notes:

Authorized—$2,000,000; outstanding, $2,000,000.

Dated—Dec. 1, 1926; due Dec. 1, 1931.

Interest Paid—J&D 1 at Halsey, Stuart & Co., Inc., New York and Chicago or at Minnesota Loan & Trust Co., Minneapolis, Minn.

Denomination—Coupon, $500 and $1,000; registerable as to principal.

Callable—On 30 days' notice at 103 to Dec. 1, 1927, incl., at 102½ to Dec. 1, 1928, incl., at 102 to Dec. 1, 1929, incl., at 101½ to Dec. 1, 1930, incl., at 101 to June 1, 1931, incl., and at par thereafter.

Security—A direct obligation of the company but not secured by mortgage. Company agrees that it (a) will maintain current assets equal to not less than 125% of current liabilities including these notes outstanding; (b) will not mortgage or pledge property, except in case of purchase money mortgages and liens and pledges in usual course of business maturing not later than one year; (c) will not create additional funded debt maturing later than one year; (d) will, in event of disposal of property, acquire other property of equal or greater value or use proceeds thereof to retire these notes and (e) will not declare dividends on preferred except out of earnings subsequent to Oct. 1, 1926 and will not pay cash dividends on common except from earnings after Dec. 1, 1926. Minnesota & Ontario Paper Co. controls majority of preferred and common stock of company and has agreed not to allow (while this issue is outstanding) such control to be disposed of, except to itself or to a controlled company, unless with bankers' consent.

Purpose—Issued to retire floating debt and for working capital.

Tax Status—Pennsylvania and Connecticut 4 mills taxes and Massachusetts 6% income tax refunded. Company pays normal income tax up to 2%.

Offered—($2,000,000) at 99 in Jan., 1927 by Halsey, Stuart & Co., Inc., Chicago, and Minnesota Loan & Trust Co., Minneapolis.

Capital Stock: 1. National Pole & Treating Co. 6% cum. preferred, series A: Authorized $6,000,000, outstanding, $3,000,000; par $100. Majority owned by Minnesota & Ontario Paper Co. Initial dividend of 1½% paid Jan. 1, 1927. Dividends payable quarterly Jan. 1, etc.

2. National Pole & Treating Co. common: Authorized, 60,000 shares, outstanding, 30,000 shares; no par. Majority owned by Minnesota & Ontario Paper Co.

Stock transferred and registered at company's office.

MONSANTO CHEMICAL WORKS

History: Incorporated in 1901 in Missouri. Manufactures at its St. Louis, Mo. plant, fine and medicinal chemicals, condiments and flavors, including caffeine, chloral, glycerophosphates, phenacetin, saccharin, aspirin, salicylates, vanillin and coumarin, etc., also a line of intermediates including phthalic anhydride, ortho and para nitrochlorbenzol, etc. **At the East St. Louis, Ill., plant company manufactures caustic soda, zinc chloride phenol and chlorine, sulphuric and nitric acids, etc. In 1917 purchased the Commercial Acid Co. of East St. Louis.** Properties consist of 28 buildings at St. Louis, **50 buildings on 202 acres near E. St. Louis,** warehouse in New York, railroad switching facilities in St. Louis and East St. Louis plants and 84 tank cars. Company also owns a one-half interest in Graesser-Monsanto Chemical Works, Ltd., of Ruabon, North Wales, which company manufactures fine and medicinal chemicals, also phenol and cresylic acid.

Management: OFFICERS: John F. Queeny, Chairman and Pres.; Gaston Du Bois, E. M. Queeny, Vice-Pres.; J. W. Livingston, Jules Bebie, L. F. Nickell, Asst. Vice-Pres.; W. W. Schneider, Sec.; W. R. Phemister, Treas.; C. A. Zacher, Asst. Sec.; J. W. Ludwig, Aud., St. Louis, Mo. DIRECTORS: J. F. Queeny, H. O. McDonough, Gaston Du Bois, E. M. Queeny, Theodore Rassieur, J. D. Lumaghi, St. Louis; Paul Buhlig, Chicago. GENERAL AUDITORS: Price, Waterhouse & Co. ANNUAL MEETING: Last Tuesday in Jan. OFFICE: 1724 South Second St., St. Louis, Mo.

Comparative Income Account, Years Ended Dec. 31

	1926	1925	1924	1923	1922	1921
Gross profit	$881,172	$849,700	$603,232	$725,536	$370,616	$132,407
Depreciation	275,369	243,708	199,501	176,326	196,410	216,297
Net income	$605,803	$605,992	$403,731	$549,210	$175,206	(d) $83,890
Other income	20,494	60,621	23,488	48,267	55,401	157,120
Total income	$626,297	$666,613	$427,219	$597,477	$230,607	$73,230
Interest charges	197,504	180,465	145,889	184,222	209,802	251,345
Miscellaneous charges	27,386	120,664	.....	.....	.....	.....
Federal taxes	60,000	25,000	30,000	.....	.....	.....
Balance	$341,407	$340,484	$251,330	$413,255	$20,805	(d) $178,115
Earned per share	$11.01	$10.98	$8.11	$13.32	$0.67	.....

Comparative Balance Sheet, as of Dec. 31

ASSETS:	1926	1925	LIABILITIES:	1926	1925
Plant and equipment	$6,284,956	$6,130,333	Capital stock	$3,100,000	$3,100,000
Patents, good-will, etc.	1	1	Bonded debt	2,403,000	2,489,000
Investments	673,162	676,522	*Accounts payable*	*215,246*	*263,098*
Inventories	*1,579,073*	*1,332,045*	*Accrued liabilities*	*88,204*	*86,088*
Cash	*70,706*	*50,111*	*Tax reserve*	*61,906*	*30,647*
Bills and accounts receivable	*409,685*	*393,559*	Depreciation reserve	1,660,248	1,453,349
Deferred charges	154,815	181,321	Surplus	1,676,967	1,366,559
Prepaid insurance, etc.	33,173	24,850			
Total	$9,205,571	$8,788,742	Total	$9,205,571	$8,788,742

Working Capital: *1925, current assets, $1,775,715; current liabilities, $379,834; net current assets, $1,395,881.*
1926, current assets, $2,059,464; current liabilities, $365,356; net current assets, $1,694,108.

Exhibit 57

REPORT ON
INVESTIGATION OF PCB MANUFACTURING FACILITY
MONSANTO INDUSTRIAL CHEMICALS COMPANY
W. G. KRUMMRICH PLANT
SAUGET, ILLINOIS 62201

RECEIVED
Field Operations Section

MAR 08 1976

Environmental Protection Agency
State of Illinois

JANUARY 27, 1976

PERFORMED BY

U. S. ENVIRONMENTAL PROTECTION AGENCY
ILLINOIS DISTRICT OFFICE
1819 WEST PERSHING ROAD
CHICAGO, ILLINOIS 60609

AND

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
REGION IV (SW)
117 WEST MAIN STREET
COLLINSVILLE, ILLINOIS 62234

3 0 2 4 0 0 0 0 8 2 9

INVESTIGATION OF PCB MANUFACTURING FACILITY
ILLINOIS DISTRICT OFFICE, USEPA

I. Company Identification

Monsanto Industrial Chemicals Company
William G. Krummrich Plant
Sauget, Illinois 62201

Telephone: 618-271-5835

Receiving Waters: Mississippi River via the Sauget, IL Wastewater Treatment Plant

Responsible Officials
R. W. Flint, Plant Manager
A. E. Leisy, General Manufacturing Superintendent
P. E. Heisler, Director of Environmental Control
W. B. Papageorge, Manager, Product Acceptability (St. Louis)

II. Date of Inspection and Sampling

January 27, 1976

III. Participants

Company
W. B. Papageorge, Manager, Product Acceptability (St. Louis)
R. W. Flint, Plant Manager (W. G. Krummrich Plant)
A. E. Leisy, General Manufacturing Superintendent
Paul E. Heisler, Director of Environmental Control
Clarence F. Buckley, Supervisory Engineer, Environmental Control
Robert L. Harness, Senior Engineer
Julio Munoz, Environmental Control Engineer II

Sauget Village Waste Treatment Association
James Dalton, Superintendent
Fred W. Albowitz, Supervisor, WWTP

Illinois Environmental Protection Agency (618-345-6220)
Lawrence Eastep, Environmental Protection Engineer

U. S. Environmental Protection Agency (312-353-5638)
R. Edwin Zylstra, Chemical Engineer, ASB, Region V
Charles J. Miller, Physical Scientist, ASB, Region V
John F. Connell, Sanitary Engineer, ASB, Region V
Kenneth Burch, Chemical Engineer, Solid Waste Branch, Region V
Joseph V. Slovick, Engineering Technician, Illinois District Office
Roscoe W. Libby, Supv. Physical Scientist, Illinois District Office (Author)

3 0 2 4 0 0 0 0 3 0

IV. Objective

To obtain information on PCBs being discharged from the Manuturing and Incineration Facilities at the W. G. Krummrich Plant in Sauget, Illinois; and to and from the Sauget municipal wastewater treatment plant. To verify the existence of a certified SPCC plan.

V. Summary and Findings

The results of sampling for PCBs are as follows:

ILDO Sample Number C-76-	Location and Sample Description	Concentration PCB (µg/l) Aroclor 1016	Aroclor 1248	Aroclor 1254	Aroclor 1260
0349	W.G.K. Plant Process Effluent 1/	36	<0.1	16	<0.1
0350	W.G.K. Plant Incinerator Effluent	4.2	<0.1	<0.1	<0.1
0352	Sauget WWTP Influent	15	<0.1	<0.1	<0.1
0353	Sauget WWTP Effluent	24	<0.1	19	<0.1
0354	Reagent Blanks	0.2	<0.1	<0.1	<0.1

1/ W.G.K. - William G. Krummrich Plant

LOADINGS LBS. PCB TYPE

ILDO Sample Number C-76-	Location and Sample Description	Flow MGD	Loadings Pounds/Day Aroclor 1016	Aroclor 1254
0349	W.G.K. Plant Process Effluent 1/	0.105	0.0315	0.014
0350	W.G.K. Plant Incinerator Effluent	0.206	0.0072	--
0352	Sauget WWTP Influent	12	1.5	--
0353	Sauget WWTP Effluent	12	2.4	1.9

1/ W.G.K. - William G. Krummrich Plant

Monsanto in a news release dated January 26, 1976 (Appendix 5) announced to their United States capacitor and transformer industry customers that they were going to phase out PCBs. This announcement has no date and is dependent on finding an acceptable substitute material.

Measurable amounts in pounds/day are being discharged from the Sauget wastewater treatment plant to the Mississippi River. PCB can and should be eliminated from the WWTP effluent.

The plant has a properly certified SPCC plan.

VI. Description of the Industry

The only plant that manufactures PCBs in the United States is the William G. Krummrich plant of the Monsanto Industrial Chemicals Company at Sauget, Illinois. Commercial manufacture of the Aroclor brand of chlorinated biphenyls was started in 1929. The products vary from oily mobile liquids to white crystalline solids and hard noncrystalline resins. Many of the PCBs in the environment were manufactured for uses such as fire resistant heat-transfer and hydraulic fluids, lubricants for high temperature and pressure uses, sealant and expansion media, and for uses in elastomers, adhesives, paints, inks, laquers, varnish, pigments, waxes, and noncarbon carbon paper. These uses have been discontinued and the only purposes for which PCBs are presently sold are for use in electrical capacitors and transformers.

Monsanto manufactures four grades of polychlorinated biphenyls for use in electrical capacitors and transformers as shown in the table below:

Designation	Appearance	Predominant Compound	Percent Cl_2	Specific Gravity	Distil. Range °C	Flash Point °C
1221	Clear mobile oil	Monochlorobiphenyl	20.5-21.5	1.18	275-320	141-150
1242	"	Trichlorobiphenyl	42	1.36	325-336	176-180
1016	"	Trichlorobiphenyl	42	1.36	323-356	168
1254	Light yellow viscous liquid	Pentachlorobiphenyl	54	1.54	365-390	None to B.P.

Manufacturing Processes

The manufacturing unit consists of 6 chlorinators, 3 cascade and 3 batch type. The units are charged with the proper type of biphenyl and a catalyst (ferric chloride). Anhydrous chlorine is introduced into the reaction vessel and the charge is recirculated with a pump. The temperature of the mixture is kept well above the melting point of mixture, but below 150°C to avoid sublimating the material and plugging the hydrogen chloride discharge line. The pressure is kept near atmospheric with the contact time of 12-36 hours depending on the type of Aroclor desired. The HCl is scrubbed with liquid Aroclor and the anhydrous gas is sent to another part of the Sauget complex for purification.

The process is controlled by hydrometer readings for the lower chlorine contents. The more viscous material having a higher melting point is measured at the hold point where the material crystallizes, or by the ball and ring softening point test.

The crude PCB material is held at an elevated temperature and airblown for several hours before being sent to the raw Aroclor storage tanks. A fraction of a percent of alkali (NaOH or lime) is mixed with the storage tank contents to neutralize any remaining HCl or $FeCl_3$. The air from the blower tank is vented to the atmosphere after being scrubbed with water. The scrubbed air is passed through a demister before release to the atmosphere.

The raw material is vacuum distilled to remove color and any traces of catalyst or hydrogen chloride. The vacuum is obtained by steam ejectors with the condensed steam being discharged to the plant sump. The residue (montars) are drummed and sent to be incinerated. Complete distillation and mixing of the distillate is necessary to obtain a uniform material of the desired composition.

To increase the electrical resistivity a few tenths of 1 percent dehydrated fuller's earth is mixed with the material at an elevated temperature followed by filtration through paper.

Incinerator

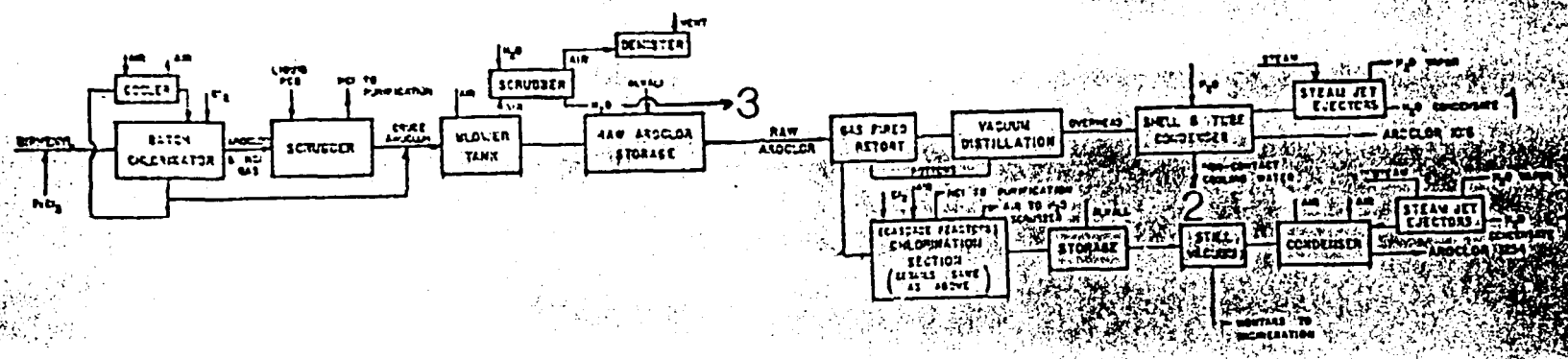
To achieve efficient destruction of PCBs a suitable balance between dwell time and temperature in the incinerator plus availability of excess oxygen must be obtained. The hydrogen chloride formed by combustion must be removed by suitable scrubbing devices. Two thousand degrees Fahrenheit plus 3 percent excess oxygen in the stack gas with a dwell time of 2 seconds or a 1.5 second dwell time at 2,700°F and 2 percent excess oxygen in the stack gas are required for efficient destruction of waste Aroclors.

The Monsanto Company employs a John Zink incinerator operating on 25 percent excess air (5 percent O_2) at temperatures in excess of 2,200°F.

The montars from the manufacturing process retorts, the bottoms from separator sumps, accumulation from drip pans, and waste Aroclors returned for destruction are pumped to the incinerator unit. Steam is fed to atomize the liquid waste stream before the fire pot. Combustion is obtained using natural gas and excess air. The combustion products are cooled by a quench pot followed by a venturi scrubber and a packed tower. The liquid wastes from the incinerator and the water phase from the sump are sent to the Sauget municipal wastewater treatment plant.

The incinerator is capable of handling 6,000,000 pounds per year. Drainage at the site is conveyed by trenches and piping to a 10,000 gallon underground basin. The water layer from this concrete sump is pumped continuously and combined with the scrubber, quench pot and packed tower effluents. The PCB fraction in the sump is periodically pumped to the waste storage tanks.

3 0 2 4 0 0 0 0 8 3 3



1 STEAM JET EJECTORS — Water Condensate

2 SHELL AND TUBE CONDENSER — Non-Contact Cooling Water

3 SCRUBBER — Water From Scrubber

Parshall Flume → TO SAUGET SEWER SYSTEM

PCB PROCESS PLANT WASTEWATER DISCHARGES

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V

MONSANTO'S KRUMMRICH PLANT-SAUGET, ILL.

PCB Manufacture Process Flow & Water Discharges

ILLINOIS DISTRICT OFFICE
1819 W. PERSHING RD.
CHICAGO, ILLINOIS 60609

Exhibit 58

[illegible] Ely & Walker Dry Goods Co. 6% cumulative second preferred; par $100:

AUTHORIZED—15,000 shares; issued 15,000 [illegible] outstanding, Nov. 30, 1940, 14,044 shares; [illegible] treasury 956 shares; par $100.

DIVIDEND RIGHTS—Has second preference [illegible] cumulative dividend of 6% per annum. [illegible] semi-annually J&J 15, to stock of record about J&J 5.

DIVIDEND RECORD—Dividends paid regu[illegible] since issuance.

VOTING RIGHTS—Four votes per share. No [illegible] can be created without consent of [illegible] of all preferred outstanding.

LIQUIDATION RIGHTS — In dissolution or [illegible] has second preference to par value [illegible] accrued dividends.

PREEMPTIVE RIGHTS—Has preemptive [illegible] in same proportion as voting power.

CALLABLE—Not callable.

LEGAL—For trust funds in New Jersey.

LISTED—On St. Louis Stock Exchange.

TRANSFER AGENT—St. Louis Union Trust Co., St. Louis.

REGISTRAR—Mercantile Commercial Bank & Trust Co., St. Louis.

PRICE RANGE—	1940	1939	1938
Second pfd. ----	102½-93	97-90	102-95

3. Ely & Walker Dry Goods Co. common; par $25.

AUTHORIZED—360,000 shares; issued 360,000 shares; outstanding Nov. 30, 1940, 251,035 shares; in treasury 108,965 shares; par $25 (changed from par $100 in January, 1923, and four $25 par shares issued for each par $100 share).

Dividend Record (in $)

(Calendar Years)

(Par $100 shares)

1913---	[1]	1914---	8.00	1915---	4.00
1916---	14.00	[3]1917-20	10.00	1921---	6.00
1922---	8.00				

(Par $25 shares)

[3]1923-24	1.50	1925---	1.75	1926-28	2.00
1929---	2.12½	1930---	2.00	1931---	0.50
1932-33	Nil	1934---	2.00	1935---	1.50
1936---	1.00	1937---	2.00	1938---	1.00
1939---	0.50	1940---	1.50	[4]1941---	0.75

[1]Record of dividends prior to 1914 not available, except for 100% in preferred stock, Jan., 1906. [2]Plus 100% stock, Jan., 1917. [3]Plus 133 1/3% stock, Jan. 25, 1923. [4]To Mar. 2.

Dividends payable quarterly Mar. 1, etc. to stock of record about Feb. 19, etc.

VOTING RIGHTS—One vote per share.

PREEMPTIVE RIGHTS — Has preemptive rights in same proportion as voting power.

LISTED—St. Louis Stock Exchange.

TRANSFER AGENT—St. Louis Union Trust Co., St. Louis.

REGISTRAR—Mercantile Commercial Bank & Trust Co., St. Louis.

PRICE RANGE—	1940	1939	1938
Common------	19½-15	19-14½	21-16⅞

MONSANTO CHEMICAL COMPANY

CAPITAL STRUCTURE

CAPITAL STOCK

Issue	Par Value	Amount Outstanding	Earned per Sh. 1940	Earned per Sh. 1939	Divs. per Sh. 1940	Divs. per Sh. 1939	Call Price	Price Range 1940	Price Range 1932–40
$4.50 cumulative preferred, A------	No par	50,000 shs.	$57.38	$54.29	$4.50	$4.50	[3]$110	119 -110	121 -105
$4.50 cumulative preferred, B------	No par	50,000 shs.			4.50	4.34	[2]115	122 -113½	[4]122½-112
[illegible] cumulative preferred, C------	No par	75,000 shs.	---	---	---	---	[2]107.50	---------	---------
Common ------------------------	$10	1,241,694 shs.	4.26	4.01	3.00	3.00	---	119 - 79	[1]119 - 39

[1]After 100% stock dividend in 1934. Range prior to 100% stock dividend, years 1932-34, incl.: 96½-13⅜.
[2]Subject to change; see description below.
[3]Sold in Mar., 1941.
[4]1939-40 range.

HISTORY

Incorporated in Delaware, Apr. 19, 1933 and [illegible] May 31, 1933 acquired the assets and business of Monsanto Chemical Works, incorporated in Missouri in 1901 with a capital of [illegible] by John F. Queeny to produce saccharin.

In 1918 acquired the plant of Commercial [illegible] Co. at East St. Louis, Ill., manufactur[illegible] sulphuric, hydrochloric, nitric, etc., acids.

In 1920 acquired a 50% interest in an English company established in 1869 subsequently [illegible] as The Graesser-Monsanto Chemical [illegible] Ltd. (now Monsanto Chemicals, Ltd. [illegible] appended statement) manufacturers of [illegible] tar products. In Feb., 1929 purchased the [illegible] 50% interest in this English sub[illegible]. Later in 1929 the English company [illegible] strengthened its raw material position by the [illegible] of the (1) Wear Tar Works of [illegible] & Co. (2) the methyl salicylate [illegible] of K. B. Mavlankar, and (3) Brother[illegible] Saccharin Mfg. Co.

In June, 1925 formed Virginia Fertilizer [illegible] to manufacture fertilizer and chemicals [illegible] Norfolk, Va.

In July, 1929 acquired all the stock of The [illegible] Service Laboratories Co., manufac[illegible] of coal tar chemicals for the tire and [illegible] industry with plant at Nitro, W. Va., [illegible] therefor 9,430 shares of stock.

In Sept., 1929 acquired the fine chemical [illegible] of Mathieson Alkali Works, Inc., [illegible] therefor 6,490 shares of stock.

In Oct., 1929 acquired the business and as[illegible] of Merrimac Chemical Co. (founded in [illegible] manufacturers of heavy acids and [illegible] with plants at Everett and Woburn, [illegible] paying therefor 87,441 shares of stock. [illegible] Merrimac Chemical Co., Inc. [illegible] formed Nov. 16, 1929 to acquire these as[illegible]. In Mar., 1935 Merrimac acquired the [illegible] chemical business of Consolidated Ren[illegible] Co. for which 3,000 shares of Monsanto [illegible] were issued.

In May, 1933 purchased a controlling inter[illegible] in the voting stock of The Swann Corp., [illegible] of phosphoric acid and its [illegible], calcium carbide, abrasives, lamp [illegible] with principal plants at Anniston, [illegible] and St. Louis, Mo. In Mar., 1935 entered [illegible] whereby The Swann Corp. was [illegible] In connection with the 1935 acquisi[illegible] [illegible] shares of stock were issued.

In Sept., 1933, jointly with Central Aguirre [illegible] formed New England Alcohol Co. [illegible] 55%; Central Aguirre, 45%) to [illegible] an industrial alcohol plant of 3,- [illegible] gallons annual capacity at Boston, [illegible] a raw material molasses supplied by [illegible] Aguirre In 1935 this plant began the [illegible] of dry ice.

In early 1934 acquired a 75% interest in [illegible] Petroleum Chemicals, Inc. (which [illegible] absorbed Dayton Synthetic [illegible] engaged in the development of [illegible] for the manufacture of chemicals [illegible] petroleum In 1936 acquired the remain[illegible] control in Monsanto Petroleum [illegible] Inc., through the acquisition of [illegible] Hochwalt Laboratories, Inc. (en[illegible] general research work at Dayton, O.). In acquiring Thomas & Hochwalt, 14,000 shares of stock were issued.

In 1936 dissolved the following subsidiaries and acquired their assets—The Rubber Service Laboratories Co.; The Elko Chemical Co.; Monsanto Petroleum Chemicals, Inc.; Commercial Acid Co.; Virginia Fertilizer Corp.; Monsanto Chemical Co. of Alabama; Provident Chemical Works; Wilckes, Martin, Wilckes Co.; Iliff-Bruff Chemical Co.; Federal Phosphorus Co.; Jax Plant Food Co.; Muscle Shoals Fertilizer Co.; Swann Research, Inc.; Urbain Chemical Co., Anderson Chemical Co. and Swann Mining Co.

In 1937 dissolved the following subsidiaries and acquired their assets—Merrimac Chemical Co. and Monsanto Holdings, Ltd.

On Apr. 1, 1938 acquired all the assets and business of Fiberloid Corp. (established in 1890), a leading manufacturer of cellulose acetate and cellulose nitrate plastics with plant at Springfield, Mass., in which approximately a 14% interest had been held since 1934, paying for the 86% minority interest 148,524 shares of stock. In acquiring Fiberloid Corp. obtained a 50% stock interest in Shawinigan Resins Corp. (50% owned by Shawinigan Chemicals, Ltd., a subsidiary of Shawinigan Water & Power Co.) which in 1938 completed a plant at Springfield, Mass. to produce vinyl acetals (used as an interlayer in safety glass manufacture).

In May, 1939 acquired for an undisclosed sum Resinox Corp. (jointly owned by Corn Products Refining Co. and Commercial Solvents Corp.), manufacturers of phenol-formaldehyde or Bakelite-type plastics with leased plant at Edgewater, N. J. On June 25, 1940, Resinox Corp. was liquidated and its assets transferred to company. In Jan., 1941 these operations were transferred to Springfield, Mass. as an addition to the company's Plastics Division plant.

In Apr., 1940, company entered into an agreement with Australian interests for the formation of Monsanto Chemicals (Australia) Proprietary, Ltd., to manufacture company's products in that commonwealth. This project will permit Monsanto to serve the market developing in Australia, and will protect in some degree part of the export field served by Monsanto's British company before outbreak of the war. The Australian interests are providing all necessary capital in return for Monsanto's contributions in research information, plant design and production experience. The company is to receive one-half interest in the ordinary shares and the Australian interests are to receive the other half interest in ordinary shares plus preference shares or a preferred claim equal to capital and tangible assets contributed by them.

In 1940 company's investment in Watauga Mining Co. was sold and Nolichuky Power Co's. charter was forfeited.

SUBSIDIARIES

Functions chiefly as an operating company but as of Dec. 31, 1940 owned 100% of the voting control of the following:

Name and business:

Merrimac Chemical Transportation Co.—Transportation.

Fiberloid, Inc.—Inactive

Hiwassee Power Co.—Inactive

Monsanto Chemicals, Ltd.—Operates British business (see appended statement).

British Saccharin Mfg. Co., Ltd. (100%)—Inactive.

As of Dec. 31, 1940 owned 55% of the voting control of New England Alcohol Co. (45% owned by Central Aguirre Associates) and 50% of the voting power of Shawinigan Resins Corp. (Mass.) and M. & M. Acid Corp. (Mo.). Through its subsidiary Monsanto Chemicals, Ltd. owns 50% of the voting power of Monsanto (Canada) Ltd. and British Saccharin Sales Co., Ltd.

BUSINESS & PRODUCTS

Manufactures and sells a widely diversified line of chemical products. Among the products are:

Heavy Chemicals: Sulphuric, nitric and hydrochloric acids, chlorine, caustic soda, alum, nitre cake, sodium sulphite, sodium sulphite and sodium sulphide.

Coal Tar Intermediates: Phenol, chlorbenzene, phthalic anhydride, maleic and anyhydride, etc.

Medicinals and Fine Chemicals: Glycerophosphates, acetphenetidin, acetanilid, salicylic acid, aspirin and various other salicylates, caffeine, phenolphthalein, sulfanilamide, saccharin, vanillin, coumarin, sodium benzoate benzoic acid and theobromine.

Phosphorus and Phosphoric Acid Compounds: Phosphoric acid, tetraphosphoric acid, monoammonium-phosphate, sodium acid pyrophosphate, monocalciumphosphate, trisodiumphosphate, tetrasodiumpyrophosphate, and ferro phosphorus.

Plastics: Nitrocellulose, cellulose acetate and vinyl plastics, phenolic, petroleum and polystyrene resins.

Plasticizers & Solvents: Dibutyl phthalate, diethyl phthalate, dimethyl phthalate, tricresylphosphate, triphenylphosphate, ethyl and butyl acetates, chlorinated diphenyls, phthalyl glycolate and special resins.

Rubber Chemicals: Accelerators and antioxidants.

Tar Acid Chemicals: Cresylics, pure cresols and creosote oil; which are made by the company's British subsidiary, but not by the company in its domestic subsidiaries.

Miscellaneous Chemicals: Calcium carbide, lacquers, alcohols, abrasives, inhibitors, lampblack, wetting agents, detergents, antiseptics, germicides, insecticides, dry ice, tanning agents and chemicals for oil and mining industries.

The principal consuming industries are ranked below:

Relative Importance—Consuming Industries

	1940	1939
Food ----------------------	1	1
Glass and vitreous products--	2	3
Pharmaceuticals ------------	3	2
Rubber ---------------------	4	5
Plastics --------------------	5	4
Paint, varnish & printing ink	6	6
Colors and dyestuffs --------	7	7
Paper and printing ----------	8	10
Metal fabrication -----------	9	12

	1940	1939
Petroleum	10	9
Laundry and cleaning	11	11
Soap	12	8
Iron and steel	13	13
Textile	14	14
Non-ferrous metals	15	15
Transportation equipment (air, land and water)	16	17
Leather	17	16
Pub. util. & municipalities	18	18
Lumber	19	22
Insecticides and germicides	20	21
Fertilizer	21	20
Perfumes and cosmetics	22	19
Miscellaneous classifications	23	23

In turn, many of these industries, such as glass, plastics, rubber, certain types of paints and varnishes, find automobile manufacture one of their chief outlets. This industry also is a large consumer of steel, textiles and leather. It is not feasible to ascertain the percentage of Monsanto products which ultimately find their way into automobiles, but it is substantial.

The products used by the food industry find such varied uses as flour bleaching; sweetening and flavoring of beverages; flavors in candy, biscuits and confectionery; as an ingredient of self-rising flour, baking powder and animal foods; and as an adjunct in butter, milk, cheese and canned food production. Products sold to the pharmaceutical industry have varied uses, including dentifrice bases; flavorings, bouquets and germicides for mouth washes and medicinal soaps; and in many important organic medicinal products such as aspirin. The important growth of the glass and vitreous product industry as a consumer reflects the sale of plastics for the safety glass industry by the Fiberloid Division acquired in April, 1938.

Among the important raw materials purchased are sulphur, benzol, toluol, caustic soda, soda ash, molasses, naphthalene, cellulose acetate, acetone, butyl alcohol and acetate, formaldehyde, acetic anhydride. Large quantities of fuels and electric power are also purchased.

The British subsidiary, Monsanto Chemicals, Ltd. (see appended statement) manufactures coal tar products used chiefly in the pharmaceutical, plastics, rubber and food industries.

A subsidiary, New England Alcohol Company, produces industrial alcohol.

A subsidiary, Shawinigan Resins Corporation, produces vinyl resins, the major portion of which is sold to the parent for processing and sale to safety glass manufacturers. This subsidiary also markets vinyl resins for other uses.

PRINCIPAL PLANTS & PROPERTIES

In March, 1930 large and important manufacturing units of Merrimac Manufacturing Company at the Woburn, Mass. plant were destroyed by fire. By late 1931 manufacturing operations formerly carried on at Woburn were transferred and consolidated with the Everett, Mass. plant.

In July, 1937 began operation of the elemental phosphorous plant at Monsanto, Tenn. by an electric furnace process utilizing TVA power. Operating difficulties were experienced, but were overcome by the middle of 1938.

Location	Products
[1]Monsanto, Ill.	**[1]Sulphuric, nitric and hydrochloric acids, phenol and other coal tar intermediates, phosphates, chlorine and caustic soda.**
St. Louis, Mo.	Fine organic chemicals.
South St. Louis, Mo.	[2]Phosphates.
Anniston, Ala.	[3]Food grade phosphates; also calcium carbide, aluminum oxide and diphenyls.
Monsanto, Tenn.	Elemental phosphorus and ferro phosphorus.
Everett, Mass.	Sulphuric and hydrochloric acids used in the textile, leather and paper industries; also lacquer solvents and several tonnage organic chemicals which are sold to the plastics and dyestuff industries.
Nitro, W. Va.	Chemicals used in the rubber, textile, steel and mining industries.
Camden, N. J.	Lampblack.
Norfolk, Va.	Fertilizers and theobromine.
Springfield, Mass.	Plastics and molding compounds.

[1]Phosphates made from raw material supplied by Monsanto Tenn. plant.

[2]Phosphoric acid supplied by Anniston, Ala. and Monsanto, Ill. plants.

[3]In 1941 the company was erecting a war chemical manufacturing plant for the Government at Monsanto, Ill., estimated to cost $2,282,000 on a cost plus fixed-fee basis (upon which the company does not expect to make any profit) to be operated by the company for account of the Government.

The British subsidiary operates plants at Ruabon, North Wales and Sunderland, Eng., engaged in the manufacture and refining of tar acids and in the manufacture of organic chemicals.

New England Alcohol Co. operates an industrial alcohol and dry ice plant at Everett, Mass.

Shawinigan Resins Corp. operates a plant at Springfield, Mass. for the production of vinyl acetal plastics sold largely to the parent which in turn processes them for use in safety glass production.

Phosphate rock deposits are located in Maury County, Tenn. and Lafayette County, Fla.

In 1941 company was constructing a new plant at Trenton, Mich., near Detroit, for manufacture of phosphate salts; displacing some of the manufacturing done at the Anniston, Ala. and Monsanto, Ill. plants.

MANAGEMENT

Officers:

Edgar Monsanto Queeny, President
Charles Belknap, Exec. Vice-President
G. Lee Camp, Vice-President
William M. Rand, Vice-President
Gaston DuBois, Vice-President
John W. Livingston, Vice-President
John C. Brooks, Vice-President
Samuel W. Allender, Asst. to President
James W. Irwin, Assistant to President
William W. Schneider, Secretary
Charles E. Caspari, Jr., Asst. Secretary
Fred A. Ulmer, Treasurer
John F. Martin, Assistant Treasurer
Daniel M. Sheehan, Comptroller
Edwin J. Cunningham, Asst. Comptroller
John W. Ludwig, Assistant Comptroller
William I. Warren, Asst. Comptroller

Directors:

[1]Charles Belknap, St. Louis
John C. Brooks, Springfield, Mass.
G. Lee Camp, St. Louis
[1]Gaston DuBois, St. Louis
Lloyd F. Nickell, London, Eng.
[1]Edgar Monsanto Queeny, St. Louis
William M. Rand, Boston, Mass.
Theodore Rassieur, St. Louis
Walter W. Smith, St. Louis

[1]Member of Executive Committee.

Annual Meeting: Fourth Tuesday in March.

Number of Stockholders: Dec. 31, 1939, preferred, 1,910; common, 9,043.

Number of Employees: Dec. 31, 1939, 6,580.

General Office: St. Louis, Mo.

Management Profit Sharing: An executive and key men bonus plan was adopted in 1929 and continued by the present company in 1933, upon succeeding to the business and assets of Monsanto Chemical Works and was approved by stockholders in Mar., 1936. The bonus is based upon annual net earnings after income taxes and after provision for return on invested capital varying from 4% to 10%. Bonus plans of the same general type are in effect for New England Alcohol Co. and Monsanto Chemicals, Ltd. Such bonuses earned for all companies amounted to $227,819 in 1934; $323,343 in 1935; $350,970 in 1936; $322,913 in 1937; $160,691 in 1938; $382,478 in 1939 and $321,047 in 1940.

INCOME ACCOUNTS

COMPARATIVE CONSOLIDATED INCOME ACCOUNT, YEARS ENDED DEC. 31

(Taken from reports to Securities and Exchange Commission)

	[3]1940	1939	1938	[2]1937	[2]1936	[1]1935	1934
Sales, less returns, discts., & allow.	$45,607,600	$42,982,599	$31,935,391	$33,202,356	$28,848,438	$24,699,316	$17,543,750
[4]Cost of goods sold	30,917,569	30,123,410	23,503,063	23,008,072	19,624,005	16,510,543	12,339,434
Research & mfg. devel. exps.	1,289,009	1,192,050	1,221,622	1,011,629	894,563	687,978	429,450
[4]Selling general & adm. expenses	4,192,251	4,394,570	3,301,169	3,140,793	2,871,116	2,950,308	1,876,841
Prov. for uncollectible accounts	49,300	45,602	38,893	84,966	96,284	33,004	22,997
Operating profit	9,159,471	7,226,967	3,870,642	5,956,896	5,362,470	4,517,483	2,875,0[illegible]
Dividends received	308,618	41,924	48,013	163,268	156,860	72,227	53,1[illegible]
Royalties earned	217,938	128,649	321,539	235,667	189,728	101,283	57,8[illegible]
Miscellaneous other income	169,259	138,310	316,416	110,448	94,945	265,742	288,9[illegible]
Gross income	9,855,287	7,535,850	4,556,610	6,466,277	5,804,003	4,956,736	3,275,0[illegible]
Interest on funded debt	-------	-------	-------	-------	-------	42,302	55,0[illegible]
Federal capital stock tax	120,190	95,362	84,700	81,452	98,368	55,296	32,5[illegible]
Amort. of emergency plant facilities	402,800	-------	-------	-------	-------	-------	-------
Miscellaneous income deductions	34,262	385,964	327,514	192,809	71,315	204,438	67,515
Balance	9,298,034	7,054,524	4,144,396	6,192,016	5,634,322	4,654,700	3,119,9[illegible]
Prov. for income taxes	2,246,021	1,508,108	853,877	993,338	954,152	644,827	481,8[illegible]
Excess profits tax	1,262,349	-------	-------	-------	-------	-------	-------
Surtax on undistributed profits	-------	-------	-------	36,167	74,577	-------	-------
Minority int. in New Eng. Alco.	51,515	52,051	62,739	83,094	55,197	70,122	-------
Dividends on subs. preferred stocks	-------	65,451	77,187	80,358	81,692	96,360	18,57[illegible]
[5]Net inc., Swann Corp. & subs.	-------	-------	-------	-------	-------	252,375	-------
Net income to surplus	5,738,149	5,428,914	3,150,593	4,999,059	4,468,704	3,591,016	2,619,4[illegible]
[6]Earned surplus beginning of year	12,523,905	11,270,073	10,868,787	9,283,005	7,775,076	5,037,047	1,602,9[illegible]
[7]Other surplus credits	-------	-------	-------	124,383	-------	252,375	-------
[8]$4.50 ser. A & B preferred divs.	450,000	450,000	329,500	194,500	-------	-------	-------
[9]Common dividends	3,725,082	3,725,082	2,419,806	3,343,161	2,960,775	-------	-------
[10]Other surplus debits	4,516,912	-------	-------	-------	-------	1,105,360	79,2[illegible]
Earned surplus end of year	$9,570,060	$12,523,905	$11,270,073	$10,868,787	$9,283,005	$7,775,076	$4,143,3[illegible]
SUPPLEMENTARY P. & L. DATA							
Maintenance & repairs	$2,528,655	$2,402,673	$2,221,875	$1,985,051	$1,376,502	$1,257,644	$982,[illegible]
Depl., depr. & obsolescence	2,782,867	2,723,062	2,561,995	1,993,202	1,561,619	1,279,984	898,6[illegible]
Amort. of emergency plant facilities	402,800	-------	-------	-------	-------	-------	-------
Taxes (other than income, etc.)	1,110,674	1,008,629	804,443	644,904	459,533	318,991	183,2[illegible]
Rents and royalties	572,921	466,166	226,922	199,929	252,492	180,632	208,[illegible]
Parent company's net sales:							
To customers	$43,633,129	$36,496,218	$25,833,167	$26,631,477	Not stated	Not stated	Not stat[illegible]
To subsidiaries	1,065,630	1,159,108	794,514	530,781	-------	-------	-------
Total	44,698,759	37,655,326	26,627,681	27,162,257	-------	-------	-------

974 Clair County, Illinois, in Book of Plats "I" on page 16.
situated in the City of East St. Louis, County of St. Clair, in the State of Illinois
In Testimony Whereof, The said National Oats Company hath hereunto caused its corporate seal to be affixed, and these presents to be signed by its President, and attested by its Secretary, this 15th day of June A. D.1942.

(Corporate Seal)

$1.10 in $1
& 10¢ den.
Series 1941-2
J C R
6/15/42
INTERNAL REVENUE

National Oats Company
By John C Reid President.
Attest: A. S. Vermeersch Secretary.

State of Iowa }
Linn County. } ss.

I, Jane E. Riley the undersigned a Notary Public in and for said County in the State aforesaid, Do Hereby Certify That John C. Reid personally known to me to be the President of the National Oats Company and A. S. Vermeersch personally known to me to be the Secretary of said corporation whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that as such President and Secretary, they signed and delivered the said instrument of writing as President and Secretary of said corporation and caused the corporate seal of said corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said corporation as their free and voluntary act, and as the free and voluntary act and deed of said corporation for the uses and purposes therein set forth.

Given under my hand and Notarial seal, this 15th day of June A. D. 1942.

Jane E Riley
Notary Public in & for Linn County, Iowa

(Notarial Seal-Iowa)

My Commission expires 7/4/42

Filed for record this 22nd day of June, A. D. 1942 at 4:20 P. M. Instrument No. 380024

* * * * * * * * * * * *

Warranty Deed

This Indenture Witnesseth, That the Grantor, **Monsanto Chemical Company**, a Delaware corporation duly licensed to do business in the State of Illinois, having its principal office in the City of St. Louis, Missouri, for and in consideration of Two Thousand, Nine Hundred Forty-three ($2,943.00) Dollars in hand paid, conveys and warrants to the **United States of America**, the Grantee, that certain piece of parcel of land situated in the Village of Monsanto, St. Clair County, Illinois, more particularly described as follows:

Part of the Third Subdivision of the Cahokia Commons beginning at a point in the eastern line of tract of land sold by the Monsanto Chemical Company, a Delaware corporation, to **Evans-Wallower Zinc Company**, by deed dated the 30th day of October 1928 and recorded in the Recorder of Deeds Office in Book 608, page 579, said point being distant 600 feet north of the southeastern corner of said tract so conveyed, thence east and parallel with Monsanto Avenue 380 feet, thence north and parallel with the east line of said Evans-Wallower Zinc Company tract 334.50 feet to a point in the north line of Lot 238 in said Third Subdivision of the Cahokia Commons, thence west along said north line of Lot 238 a distance of 380 feet to the east line of said Evans-Wallower Zinc Company tract, thence south along said east line 334.50 feet to the point of beginning and containing 2.918 acres, all according to survey made by Pittman's Company of Surveyors & Engineers.

Provided, however, that this conveyance is made on the condition that if and when the Secretary of War determines the United States no longer needs the above described land for

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any purpose of the United States, and if the company, within ninety (90) days from the date of notice in writing from the Secretary of War that the United States no longer needs said land for any purpose of the United States, will pay the United States the sum of $2,918.00 the title to said land shall revert to said company upon such payment within said ninety (90) day period.

Said conveyance is subject to general taxes for the year 1941, which the Grantor agrees to pay.

Monsanto Chemical Company and the United States of America, and their respective successors, assignees, grantees, lessees and licensees hereby release and waive any claims for damages against the other party hereto and its successors, assignees, grantees, lessees and licensees on account of fumes, gases, vapors, dust and noises emanating from the manufacturing plant of the other party, its successors, assignees, grantees, lessees and licensees, but not including the effect of explosion.

In Witness Whereof, the Monsanto Chemical Company has caused this instrument to be executed in its behalf by its Vice-President and its corporate seal to be hereunto affixed, attested by its Assistant Secretary, this 15th day of January, 1942.

(Corporate Seal) Monsanto Chemical Company

Attest: By John W. Livingston
Vice-President

C.E. Caspari, Jr.
Assistant Secretary

$3.30 in $1.-
25¢-10¢-5¢
2¢&1¢ den.
Series 1941-2
6/22/42
JWS

State of Missouri)
) SS
City of St. Louis)

I, the undersigned, a Notary Public, within and for the City of St. Louis and State of Missouri, do hereby certify that John W. Livingston and Charles E. Caspari, Jr. to me personally known and known to be the same persons whose names are subscribed to the foregoing instrument as Vice-President and Assistant Secretary respectively of Monsanto Chemical Company, a corporation, appeared before me this day in person and acknowledged that they signed and delivered the said instrument as their own free and voluntary act and as the free and voluntary act of said Monsanto Chemical Company, a corporation, for the uses and purposes therein set forth by order and authority of its board of Directors; and the said Charles E. Caspari, Jr., Assistant Secretary, did also then and there acknowledge that he, as custodian of the corporate seal of Monsanto Chemical Company, a corporation, did affix the said corporate seal of Monsanto Chemical Company, a corporation, to said instrument as his own free and voluntary act and as the free and voluntary act of said Monsanto Chemical Company, a corporation, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 15th day of January, 1942.

I do hereby certify that I am and was at the time of taking the above acknowledgment a duly commissioned, qualified and acting notary public within and for the City of St. Louis and State of Missouri, and authorized by the laws of the State of Missouri to administer oaths and take acknowledgments.

My commission expires October 10, 1945.

Margaret Donegan
Notary Public

(Notarial Seal - City of St. Louis, Mo.)

1.1.2
Received
Feb 6 1942
U.M.V.D.
St. Louis,
Mo.

Filed for record this 23rd day of June A. D. 1942 at 1:40 P. M. Instr. #380055

* * * * * * * * * * * *

Financial & Operating Ratios	1943	1942	1941	1940	1939	1938	1937
Current assets—current liabilities	5.50	4.28	4.59	5.81	5.38	6.59	5.52
% cash & securities to current assets	43.94	34.32	33.39	36.64	36.68	32.00	41.29
% inventory to current assets	49.02	57.84	56.32	54.96	50.70	57.76	51.73
% net current assets to net worth	54.11	53.28	52.89	52.19	51.94	51.47	52.18
% property depreciated	58.60	56.75	55.37	55.39	55.85	55.74	54.89
% annual deprec. to gross property	1.80	1.76	1.71	1.53	1.94	1.66	1.31
Capitalization:							
% Preferred stock	21.07	21.07	21.26	21.36	21.52	21.57	21.58
% Common stk. and surplus	78.93	78.93	78.74	78.64	78.48	78.43	78.42
Sales—inventory	2.39	1.89	1.99	2.00	2.10	1.70	1.86
Sales—receivables	16.66	13.91	10.89	12.20	8.42	9.57	13.80
% sales to net property	322.33	300.92	289.82	264.95	265.04	233.87	250.27
% sales to total assets	68.59	64.50	65.09	61.73	60.27	54.23	54.62
% net income to total assets	5.67	6.34	7.54	8.72	8.35	7.16	8.58
% net income to net worth	6.41	7.45	8.78	9.78	9.40	7.85	9.61
Preferred dividend earned	5.07	5.89	6.88	7.64	7.28	6.06	7.43
Analysis of Operations	%	%	%	%	%	%	%
Net sales	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cost of sales	81.79	78.36	78.51	80.01	80.47	82.75	81.01
Selling & admin. expenses	5.41	3.77	1.94	2.41	3.44	3.91	3.02
Operating profit	12.80	17.86	19.55	17.58	16.09	13.34	15.97
Other income	1.89	1.95	0.96	2.00	1.34	2.38	1.43
Total income	14.68	19.81	20.51	19.58	17.43	15.72	18.40
Other deductions	0.09	0.10	0.10	0.26	0.78	0.24	0.11
Fed. income taxes and surtax	[1]6.33	9.89	8.27	4.26	2.79	2.26	2.58
Provision for contingencies	-------	-------	0.56	0.93	-------	-------	-------
Net income to surplus	8.26	9.83	11.58	14.13	13.86	13.21	15.76

[1]Includes provision for renegotiation less post-war credit.

CAPITAL STOCK

1. MacAndrews & Forbes Co. 6% cumulative preferred; par $100:

AUTHORIZED—32,385 shares (reduced from 40,000 shares Oct. 25, 1932); in treasury 637 shares; outstanding 19,904 shares; par $100.

DIVIDEND RIGHTS—Has preference to cumulative dividend of 6%, payable quarterly, semi-annually or annually as directors determine.

DIVIDEND RECORD—Regular dividends paid quarterly Jan. 15, etc. to stock of record about Dec. 31, etc.

VOTING RIGHTS—None.

LIQUIDATION RIGHTS—In liquidation has preference to par and dividends.

PREEMPTIVE RIGHTS—Has preemptive rights in any new issue of same class of stock.

CALLABLE—Not callable; option to call expired in 1912.

LISTED—New York Stock Exchange.

TRANSFER AGENT—Guaranty Trust Co., New York.

REGISTRAR—National City Bank, New York.

PRICE RANGE—	1943	1942	1941
Preferred	138½–133	131–122	138–132

2. MacAndrews & Forbes Co., common; par $10:

AUTHORIZED—536,104 shares (reduced from 600,000 shares Oct. 25, 1932); outstanding, 303,894 shares; in treasury, 3,498 shares; par $10 (changed from $100 par to no par Dec. 29, 1925; 4 no par shares issued for each $100 share; changed from no par to $10 par, share for share, Oct. 25, 1932).

Dividend Record (in $)

($100 par shares)

1902	Nil	1903	2.00	1904	5.00
1905–07	15.00	1908	24.00	1909	23.00
1910	38.00	[1]1911	20.00	1912	14.50
1913–15	10.00	1916	15.00	1917	19.00
1918	13.00	1919	12.50	[2]1920	14.00
1921	8.00	1922	10.00	1923	13.00
1924–25	14.00	[3]1926	7.50		

(No par shares after 4 for 1 stock split)

1926	1.95	1927–28	3.50	1929–30	2.85
1931	2.15	1932	1.35		

($10 par shares)

1933	1.50	1934	2.35	1935	3.00
1936–38	2.50	1939	2.00	1940	2.40
1941	2.50	1942	1.80	1943	1.65
[4]1944	0.85				

[1]Plus $1,000,000 in common stock of J. S. Young Co.
[2]Plus 50% in stock.
[3]Paid prior to stock split.
[4]To April 15.

Dividends payable quarterly Jan. 15, etc., to stock of record about Dec. 31, etc.

VOTING RIGHTS—Full.

PREEMPTIVE RIGHTS—Has preemptive rights in any new issue of capital stock.

LISTED—New York Stock Exchange.

TRANSFER AGENT—Guaranty Trust Co., New York.

REGISTRAR—National City Bank, New York.

PRICE RANGE—	1943	1942	1941
Common	29–20½	23¼–15⅛	31⅝–19

MONSANTO CHEMICAL COMPANY

CAPITAL STRUCTURE

CAPITAL STOCK

Issue	Par Value	Amount Outstanding	Earned per Sh. 1943	Earned per Sh. 1942	Divs. per Sh. 1943	Divs. per Sh. 1942	Call Price	Price Range 1943	Price Range 1932–43
1. $4.50 cumulative preferred, A	No par	50,000 shs.			$4.50	$4.50	[5]$110	119 –113	121 –105
2. $4.50 cumulative preferred, B	No par	50,000 shs.	$25.31	$26.27	4.50	4.50	[5]112.50	121 –116½	[4]123 –112
3. $4 cumulative preferred, C	No par	110,000 shs.			4.00	4.00	[5]107.50	114½–106½	[3]114½–102½
4. Common	$10	1,241,694 shs.	3.56	3.75	2.25	2.25	---	92½– 75½	[1]119 – 39

[1]After 100% stock dividend in 1934. Range prior to 100% stock dividend, years 1932-34, incl.: 96½–13⅜.
[2]Subject to change; see description below.
[3]1941-43 range.
[4]Range since 1939.

HISTORY

Incorporated in Delaware, Apr. 19, 1933 and on May 31, 1933 acquired the assets and business of Monsanto Chemical Works, incorporated in Missouri in 1901 with a capital of $5,000 by John F. Queeny to produce saccharin.

In 1918 acquired the plant of Commercial Acid Co. at East St. Louis, Ill., manufacturing sulphuric, hydrochloric, nitric, etc., acids.

In 1920 acquired a 50% interest in an English company established in 1869 subsequently known as The Graesser-Monsanto Chemical Works, Ltd. (now Monsanto Chemicals, Ltd.—see appended statement) manufacturers of coal tar products. In Feb., 1929 purchased the remaining 50% interest in this English subsidiary. Later in 1929 the English company strengthened its raw material position by the purchase of the (1) Wear Tar Works of Brotherton & Co. (2) the methyl salicylate business of K. B. Mavlankar, and (3) Brotherton Saccharin Mfg. Co.

In June, 1925 formed Virginia Fertilizer Corp. to manufacture fertilizer and chemicals at Norfolk, Va.

In July, 1929 acquired all the stock of The Rubber Service Laboratories Co., manufacturers of coal tar chemicals for the tire and rubber industry with plant at Nitro, W. Va., paying therefor 9,430 shares of stock.

In Sept., 1929 acquired the fine chemical business of Mathieson Alkali Works, Inc., paying therefor 6,490 shares of stock.

In Oct., 1929 acquired the business and assets of Merrimac Chemical Co. (founded in 1853), manufacturers of heavy acids and chemicals with plants at Everett and Woburn, Mass., paying therefor 87,441 shares of stock. A subsidiary, Merrimac Chemical Co., Inc. was formed Nov. 16, 1929 to acquire these assets. In Mar., 1935 Merrimac acquired the heavy chemical business of Consolidated Rendering Co., for which 3,000 shares of Monsanto stock were issued.

In May, 1933 purchased a controlling interest in the voting stock of The Swann Corp., manufacturers of phosphoric acid and its derivatives, calcium carbide, abrasives, lamp black, etc., with principal plants at Anniston, Ala. and St. Louis, Mo. In Mar., 1935 entered into contracts whereby The Swann Corp. was absorbed. In connection with the 1935 acquisition, 113,082 shares of stock were issued.

In Sept., 1933, jointly with Central Aguirre Associates, formed New England Alcohol Co. (Monsanto, 55%; Central Aguirre, 45%) to construct an industrial alcohol plant of 3,000,000 gallons annual capacity at Boston, using as a raw material molasses supplied by Central Aguirre. In 1935 this plant began the manufacture of dry ice.

In early 1934 acquired a 75% interest in Monsanto Petroleum Chemicals, Inc. (which had previously absorbed Dayton Synthetic Resin Co.), engaged in the development of processes for the manufacture of chemicals from petroleum. In 1936 acquired the remaining stock control in Monsanto Petroleum Chemicals, Inc., through the acquisition of Thomas & Hochwalt Laboratories, Inc. (engaged in general research work at Dayton, O.). In acquiring Thomas & Hochwalt, 14,000 shares of stock were issued.

In 1936 dissolved the following subsidiaries and acquired their assets—The Rubber Service Laboratories Co.; The Elko Chemical Co.; Monsanto Petroleum Chemicals, Inc.; Commercial Acid Co.; Virginia Fertilizer Corp.; Monsanto Chemical Co. of Alabama; Provident Chemical Works; Wilckes, Martin, Wilckes Co.; Iliff-Bruff Chemical Co.; Federal Phosphorus Co.; Jax Plant Food Co.; Muscle Shoals Fertilizer Co.; Swann Research, Inc.; Urbain Chemical Co., Anderson Chemical Co. and Swann Mining Co.

In 1937 dissolved the following subsidiaries and acquired their assets—Merrimac Chemical Co. and Monsanto Holdings, Ltd.

On Apr. 1, 1938 acquired all the assets and business of Fiberloid Corp. (established in 1890), a leading manufacturer of cellulose acetate and cellulose nitrate plastics with plant at Springfield, Mass., in which approximately a 14% interest had been held since 1934, paying for the 86% minority interest 148,524 shares of stock. In acquiring Fiberloid Corp. obtained a 50% stock interest in Shawinigan Resins Corp. (50% owned by Shawinigan Chemicals, Ltd., a subsidiary of Shawinigan Water & Power Co.) which in 1938 completed a plant at Springfield, Mass. to produce vinyl acetals (used as an interlayer in safety glass manufacture).

In May, 1939 acquired for an undisclosed sum Resinox Corp. (jointly owned by Corn Products Refining Co. and Commercial Solvents Corp.), manufacturers of phenol-formaldehyde or Bakelite-type plastics with leased plant at Edgewater, N. J. On June 28, 1940, Resinox Corp. was liquidated and its assets transferred to company. In Jan., 1941 these operations were transferred to Springfield, Mass., as an addition to the company's Plastics Division plant.

In Apr., 1940, company entered into an agreement with Australian interests for the formation of Monsanto Chemicals (Australia) Proprietary, Ltd., to manufacture company's products in that commonwealth. This project will permit Monsanto to serve the market developing in Australia, and will protect in some degree part of the export field served by Monsanto's British company before outbreak of the war. The Australian interests are providing all necessary capital in return for Monsanto's contributions in research information, plant design and production experience. The company is to receive one-half interest in the ordinary shares and the Australian interests are to receive the other half interest in ordinary shares plus preference shares or a preferred claim equal to capital and tangible assets contributed by them.

In 1940 company's investment in Wataugan Mining Co. was sold and Nolichuky Power Co's. charter was forfeited.

In Jan., 1943, organized under laws of State of Delaware Monsanto of Brazil, Inc. This company is engaged in production of crude theobromine in its own plant located at Bahia, San Salvador, Brazil.

In Jan., 1944, organized Monsanto Export Co. Later in 1944, acquired capital stock of I. F. Laucks, Inc., of Seattle, producer of plywood adhesives, wood preservatives and surface coatings, together with associated companies and interest in other operations in Australia, Canada and Sweden. Acquisition involved issuance of approximately 26,150 Monsanto common shares.

SUBSIDIARIES

Functions chiefly as an operating company but as of Dec. 31, 1943, owned 100% of the voting control of the following:

Name and business:

Merrimac Chemical Transportation Co.—Inactive

Monsanto of Brazil, Inc.—Produces crude theobromine.

Fiberloid, Inc.—Inactive

Hiwassee Power Co.—Inactive

Monsanto Chemicals, Ltd.—Operates British business (see appended statement).

British Saccharin Mfg. Co., Ltd. (100%)—Inactive.

As of Dec. 31, 1943 owned 55% of the voting control of New England Alcohol Co. (45% owned by Central Aguirre Associates) and 50% of the voting power of Shawinigan Resins Corp. (Mass.). M. & M. Acid Corp. (Mo.) and Monsanto (Australia) Proprietary, Ltd. Owns 50% of the voting power of Monsanto (Canada) Ltd.

Through its subsidiary Monsanto Chemicals, Ltd. owns 50% of the voting power of British Saccharin Sales Co., Ltd.

Note: In Jan., 1944, organized Monsanto Export Co. as a wholly-owned subsidiary. Later in 1944, acquired entire capital stock of I. F. Laucks, Inc., of Seattle, producer of plywood adhesives, wood preservatives and surface coatings. Latter owns majority of capital stock of Merritt Engineering & Sales Co., Inc., of Lockport, N. Y.

BUSINESS & PRODUCTS

Manufactures and sells a widely diversified line of chemical products. Among the products are:

Heavy Chemicals: Sulphuric, nitric, hydrochloric, chlorsulfonic and acetic acids, chlorine, caustic soda, alum, nitre cake, sodium sulfate, sodium sulfite and sodium sulphide.

Coal Tar Intermediates: Phenol, chlorbenzene, phthalic anhydride, maleic and anyhydride, etc.

Medicinals and Fine Chemicals: Glycerophosphates, acetphenetidin, acetanilid, salicylic acid, aspirin and various other salicylates, caffeine, phenolphthalein, sulfanilamide, saccharin, vanillin, coumarin, sodium benzoate benzoic acid and theobromine.

Phosphorus and Phosphoric Acid Compounds: Phosphoric acid, tetraphosphoric acid, monoammonium-phosphate, sodium acid pyrophosphate, monocalciumphosphate, trisodiumphosphate, tetrasodiumpyrophosphate, and ferro phosphorus.

Plastics: Nitrocellulose, cellulose acetate and vinyl plastics, phenolic, petroleum and polystrene resins.

Plasticizers & Solvents: Dibutyl phthalate, diethyl phthalate, dimethyl phthalate, tricresylphosphate, triphenylphosphate, ethyl and butyl acetates, chlorinated diphenyls, phthalyl glycolate and special resins.

Rubber Chemicals: Accelerators and antioxidants.

Tar Acid Chemicals: Cresylics, pure cresols and creosote oil: which are made by the company's British subsidiary, but not by the company in its domestic subsidiaries.

Miscellaneous Chemicals: Calcium carbide, lacquers, alcohols, abrasives, inhibitors, lampblack, wetting agents, detergents, antiseptics, germicides, insecticides, dry ice, tanning agents and chemicals for oil and mining industries.

Other Products: Plywood adhesives, wood preservatives and surface coatings.

The principal consuming industries are ranked below:

Relative Importance—Consuming Industries

	1940	1939
Food	1	1
Glass and vitreous products	2	3
Pharmaceuticals	3	2
Rubber	4	5
Plastics	5	4
Paint, varnish & printing ink	6	6
Colors and dyestuffs	7	7
Paper and printing	8	10
Metal fabrication	9	12
Petroleum	10	9
Laundry and cleaning	11	11
Soap	12	8
Iron and steel	13	13
Textile	14	14
Non-ferrous metals	15	15
Transportation equipment (air, land and water)	16	17
Leather	17	16
Pub. util. & municipalities	18	18
Lumber	19	22
Insecticides and germicides	20	21
Fertilizer	21	20
Perfumes and cosmetics	22	19
Miscellaneous classifications	23	23

In turn, many of these industries, such as glass, plastics, rubber, certain types of paints and varnishes, find automobile manufacture one of their chief outlets. This industry also is a large consumer of steel, textiles and leather. It is not feasible to ascertain the percentage of Monsanto products which ultimately find their way into automobiles, but it is substantial.

The products used by the food industry find such varied uses as flour bleaching; sweetening and flavoring of beverages; flavors in candy, biscuits and confectionery; as an ingredient of self-rising flour, baking powder and animal foods; and as an adjunct in butter, milk, cheese and canned food production. Products sold to the pharmaceutical industry have varied uses, including dentifrice bases; flavorings, bouquets and germicides for mouth washes and medicinal soaps; and in many important organic medicinal products such as aspirin. The important growth of the glass and vitreous product industry as a consumer reflects the sale of plastics for the safety glass industry by the Fiberloid Division acquired in April, 1938.

Among the important raw materials purchased are sulphur, benzol, toluol, caustic soda, soda ash, molasses, naphthalene, cellulose acetate, acetone, butyl alcohol and acetate, formaldehyde, acetic anhydride. Large quantities of fuels and electric power are also purchased.

The British subsidiary, Monsanto Chemicals, Ltd (see appended statement) manufactures coal tar products used chiefly in the pharmaceutical, plastics, rubber and food industries.

A subsidiary, New England Alcohol Company, produces industrial alcohol.

A subsidiary, Shawinigan Resins Corporation, produces vinyl resins, the major portion of which is sold to the parent for processing and sale to safety glass manufacturers. This subsidiary also markets vinyl resins for other uses.

PRINCIPAL PLANTS & PROPERTIES

In March, 1930 large and important manufacturing units of Merrimac Manufacturing Company at the Woburn, Mass. plant were destroyed by fire. By late 1931 manufacturing operations formerly carried on at Woburn were transferred and consolidated with the Everett, Mass. plant.

In July, 1937 began operation of the elemental phosphorous plant at Monsanto, Tenn. by an electric furnace process utilizing TVA power. Operating difficulties were experienced, but were overcome by the middle of 1938.

Location	Products
Monsanto, Ill.	[1]**Sulphuric, nitric and hydrochloric acids, phenol and other coal tar intermediates, phosphates, chlorine and caustic soda.**
St. Louis, Mo.	Fine organic chemicals.
South St. Louis, Mo.	[2]Phosphates.
Anniston, Ala.	[1]Food grade phosphates; also calcium carbide, aluminum oxide and diphenyls.
Monsanto, Tenn.	Elemental phosphorus and ferro phosphorus.
Everett, Mass.	Sulphuric and hydrochloric acids used in the textile, leather and paper industries; also lacquer solvents and several tonnage organic chemicals which are sold to the plastics and dyestuff industries.
Nitro, W. Va.	Chemicals used in the rubber, textile, steel and mining industries.
Camden, N. J.	Lampblack.
Norfolk, Va.	Fertilizers and theobromine.
Springfield, Mass.	Plastics and molding compounds.
Trenton, Mich.	Phosphate salts

[1]Phosphates made from raw material supplied by Monsanto Tenn. plant.

[2]Phosphoric acid supplied by Anniston, Ala. and Monsanto, Ill. plants.

The British subsidiary operates plants at Ruabon, North Wales and Sunderland, Eng., engaged in the manufacture and refining of tar acids and in the manufacture of organic chemicals.

Monsanto of Brazil, Inc. operates a plant at Bahia, Brazil, for manufacture of the bromine from cocoa cake which in turn is shipped to Monsanto plants in U. S. for manufacture of caffein.

New England Alcohol Co. operates an industrial alcohol and dry ice plant at Everett, Mass. In 1943 converted its alcohol process from molasses to grain flour.

Shawinigan Resins Corp. operates a plant at Springfield, Mass. for the production of vinyl acetal plastics sold largely to the parent which in turn processes them for use in safety glass production.

I. F. Laucks, Inc., engaged in manufacture of products for plywood industry, has plants at Seattle (2), Portsmouth, Va., Lockport, N. Y., Los Angeles, Stanbridge, Que. and Vancouver, B. C.

Phosphate rock deposits are located in Maury County, Tenn. and Lafayette Co., Fla.

In addition, is operating for the account of the Government two plants in Texas, one in Ohio and two in Illinois.

MANAGEMENT

Officers:

Edgar Monsanto Queeny, Chairman
Charles Belknap, President
William M. Rand, Vice-President
Gaston DuBois, Vice-President
Osborne Bezanson, Vice-President
Robert R. Cole, Vice-President
Daniel F. Dinsmoor, Vice-President
Francis J. Curtis, Vice-President
Samuel W. Allender, Asst. to President
William W. Schneider, Secretary
Charles E. Caspari, Jr., Asst. Secretary
Fred A. Ulmer, Treasurer
John F. Martin, Assistant Treasurer
Daniel M. Sheehan, Comptroller
Edwin J. Cunningham, Asst. Comptroller
John W. Ludwig, Assistant Comptroller
William I. Warren, Asst. Comptroller

Directors:

[1]Charles Belknap, St. Louis
Osborne Bezanson, St. Louis
[2]Gaston DuBois, St. Louis
Lloyd F. Nickell, London, Eng.
[1]Edgar Monsanto Queeny, St. Louis
[1]William M. Rand, St. Louis
Theodore Rassieur, St. Louis
Walter W. Smith, St. Louis
Charles A. Thomas, Dayton, O.

[1]Member of Executive Committee.

Annual Meeting: Fourth Tuesday in March.

Number of Stockholders: Dec. 31, 1943, preferred, 3,255; common, 10,331.

Number of Employees: Dec. 31, 1943, 11,341.

General Office: St. Louis, Mo.

INCOME ACCOUNTS

COMPARATIVE CONSOLIDATED INCOME ACCOUNT, YEARS ENDED DEC. 31
(Taken from reports to Securities and Exchange Commission)

	[3]1943	[3]1942	[3]1941	[3]1940	1939	1938	[3]1937
Sales, less returns, discts., & allow.	$81,697,059	$69,146,999	$63,756,221	$45,607,600	$42,982,599	$31,935,391	$33,202,356
[4]Cost of goods sold	59,463,099	46,932,566	41,923,609	31,320,363	30,123,410	23,503,063	23,008,072
Research & mfg. devel. exps.	1,968,960	1,666,629	1,464,031	1,289,009	1,192,050	1,221,622	1,011,629
[5]Selling general & adm. expenses	5,263,759	4,756,721	4,480,014	4,192,251	4,394,570	3,301,169	3,140,793
Prov. for uncollectible accounts	58,400	74,500	16,006	49,300	45,602	38,893	84,966
Operating profit	14,942,841	15,716,584	15,872,567	8,756,671	7,226,967	3,870,642	5,956,896
Dividends received	114,275	268,701	302,963	308,618	41,924	48,013	163,266
Royalties earned	316,371	550,107	354,454	217,938	128,649	321,539	235,667
[1]Miscellaneous other income	972,284	356,002	261,677	169,259	138,310	318,416	110,448
Gross income	16,345,751	16,891,393	16,791,662	9,452,487	7,535,850	4,556,610	6,466,277
Federal capital stock tax	247,812	205,766	284,925	120,190	95,362	84,700	81,452
Miscellaneous income deductions	53,365	96,889	80,327	34,262	385,964	327,514	192,809
Balance	16,044,575	16,588,738	16,426,409	9,298,034	7,054,524	4,144,396	6,192,016
Prov. for income taxes	2,648,000	2,649,000	3,092,000	2,246,021	1,508,108	853,877	993,338
Excess profits tax	8,030,800	8,352,000	6,517,250	1,262,349	--------	--------	--------
Surtax on undistributed profits	--------	--------	--------	--------	--------	--------	36,167
Minority int. in New Eng. Alco	50,006	71,902	47,723	51,515	52,051	62,739	83,094
Dividends on subs. preferred stocks	--------	--------	--------	--------	65,451	77,187	80,358
Net income to surplus	5,315,769	5,515,836	6,769,436	5,738,149	5,428,914	3,150,593	4,999,059
Earned surplus beginning of year	14,044,838	12,176,414	9,570,060	12,523,905	11,270,073	10,868,787	9,283,005
[7]Other surplus credits	--------	--------	--------	--------	--------	--------	124,283
[8]$4.50 ser. A & B preferred divs.	450,000	450,000	225,000	450,000	450,000	329,500	194,500
$4 series C preferred divs.	440,000	403,600	213,000	--------	--------	--------	--------
Common dividends	2,793,812	2,793,812	3,725,082	3,725,082	3,725,082	2,419,806	3,343,161
[9]Other surplus debits	--------	--------	--------	4,516,912	--------	--------	--------
Earned surplus end of year	$15,676,796	$14,044,838	$12,176,414	$9,570,060	$12,523,905	$11,270,073	$10,868,787

1944

Subscribed and sworn to before me this 18 day of November, 1946.
My commission expires 12-20-46
(Notarial Seal)—City of St. Louis, Mo.) Esther A. Blunt
Notary Public

Filed for record this 18th day of November A.D. 1946 at 1:00 P.M. Instr. #480172.

* * * * * * * * * *

This Lease, made between the Secretary of War, representing the United States of America, (hereinafter called "the Government") of the first part, and **Monsanto Chemical Company**, a Delaware corporation, (hereinafter called the "**Lessee**"), of the second part, Witnesseth: DAS

That the Secretary of War, by virtue of the authority contained in Section 1 of the Act of Congress approved July 2, 1940 (54 Stat. 712), as continued in effect by Section 13 of the Act of Congress approved June 5, 1942 (56 Stat. 317), and in consideration of the observance and performance by the Lessee of the covenants and conditions hereinafter set forth, hereby leases to the lessee for a term of five (5) years, commencing July 15, 1946, and continuing thereafter until terminated as hereinafter provided, the following described land and the buildings, improvements, machinery, and appurtenances thereunto belonging, hereinafter referred to as the "Plant", to be used for the manufacture of miscellaneous chemical products for peacetime use:

St. Louis Chemical Warfare Service Plant, Monsanto, Illinois, the property lines of which are shown outlined in red on the attached Schedule "A".

This Lease is granted subject to the following provisions and conditions:

1. That the Lessee agrees to pay the Government in equal monthly installments due in advance on the 15th day of each month beginning November 15, 1946, or beginning as of the date the Lessee commences operation of the Plant, whichever first occurs, rental at the following rates:

(a) Thirty thousand dollars ($30,000.00) per annum for the balance of the five (5) year term of this Lease;

(b) Seventy-five thousand dollars ($75,000.00) per annum for that period not exceeding ten (10) years during which this Lease is allowed to remain in effect subsequent to expiration of the five (5) year term;

(c) Sixty thousand dollars ($60,000.00) per annum thereafter for any additional period during which this Lease is allowed to remain in effect.

In the event of termination of this Lease by the Lessee, the Lessee shall pay to the Government the sum of One Hundred and Fifty thousand dollars ($150,000.00) if the effective date of termination occurs on July 16, 1951, and if the effective date of termination occurs at any time thereafter, the Lessee shall pay the sum of One Hundred and Fifty thousand dollars ($150,000.00) less a sum equivalent to the amount of One Thousand, Two Hundred and Fifty dollars ($1,250.00) per month for each full month elapsed subsequent to July 16, 1951, and prior to July 16, 1961. The Lessee shall begin immediately upon execution of this Lease expeditiously to repair, restore and condition the Plant for commercial operation, any and all work and expense attendant thereto to be borne by the Lessee without cost or liability to the Government, except to the extent otherwise provided in Condition 13 hereof. The date upon which payments of rental shall commence, whether it be November 15, 1946, or that date prior thereto upon which the Lessee commences operation of the Plant, shall be determined by mutual agreement between the Lessee and the Division Engineer and shall be evidenced by written agreement to that effect, signed by the parties hereto, in the event such date is fixed by mutual agreement, or by written notice signed by the Division Engineer, to which shall be attached a copy of the appeal to and decision of the Secretary of War or his representative or representatives pursuant to Condition 17 hereof, if such date is appealed by the Lessee, which writing shall be attached to and become a part of this agreement.

The rental above reserved, and any sum due the Government pursuant to the provisions hereinabove made in the event of termination of this Lease by the Lessee, shall be made payable to the Treasurer of the United States and forwarded by the Lessee direct to the Division Engineer, Great Lakes Division, 10 North Wacker Drive, Chicago 6, Illinois, or to a representative designated by him.

2. That immediately following execution of this Lease a survey and inventory of the Plant, including all fixtures, machinery, equipment, tools and stores embraced therein, showing description, number and condition thereof, shall be made and signed by a representative of the Government and a representative of the Lessee. Said survey and inventory shall be submitted to the Division Engineer for approval, and, upon approval, a copy thereof shall be attached hereto and become a part hereof, as fully as if originally incorporated herein. There shall be added thereto from time to time such additional fixtures, machinery and equipment as may be furnished or installed either by the Government or by the Lessee for the account of the Government. At the expiration or termination of this Lease, a similar survey and inventory shall be prepared and submitted to the Division Engineer, said survey and inventory to constitute the basis for settlement by the Lessee with the Division Engineer for leased property shown to have been lost, damaged or destroyed, any such property to be either replaced or reimbursement made therefor by the Lessee at the then current market value thereof.

3. That the Government reserves the right, by appointment and when accompanied by a representative of Lessee, at any time to enter the Plant for the purpose of inspection and inventory and then otherwise deemed necessary for the protection of the interests of the Government.

4. That the Lessee shall neither transfer nor assign this Lease; nor sublet the Plant or any part thereof; nor grant any interest, privilege or license whatsoever in connection therewith without permission in writing from the Division Engineer; provided, that this paragraph shall not prohibit the Lessee, for its own account or under any such other arrangements as it may deem desirable, from dispensing and selling food, soft drinks, tobacco products, confectionery, and similar articles to the employees of the Lessee on the Plant and provided further, that Lessee shall have the privilege of transferring and assigning to a successor to its entire business without first obtaining such written permission and Lessee, without further permission in writing, may permit use of the Plant by a wholly owned subsidiary of Lessee.

5. That the Government shall not be responsible for damages to the property of the Lessee nor for damages to the property or injuries to the person of the Lessee's officers, agents, servants or employees or other persons on the Plant as invitees or licensees of the Lessee arising from the use of the Plant or for damages for violation or infringement of any patent rights, and the Lessee shall save the Government harmless from any and all such claims; provided, that nothing in this paragraph shall be deemed to affect the liability of the Government to its own employees.

6. That the Division Engineer shall have the right to terminate this Lease by giving the following notice to Lessee:

(a) Ten days written notice in the event that the Lessee shall violate any of the terms or conditions of this Lease and persists therein for 10 days after written notice thereof by the Government; or

(b) Ten days written notice in the event that there is a declaration by the President or the Congress of the United States of a National Emergency and the Division Engineer certifies to a need for the Plant; or

(c) One year written notice given at any time subsequent to expiration of four years from the date of commencement of the term of this Lease.

7. That the Lessee shall have the right to terminate this Lease by giving to the Division Engineer one year written notice at any time subsequent to expiration of four years from the date of commencement of the term of this Lease.

8. That during the period this Lease is in effect the Lessee shall procure and maintain at its cost a standard fire and extended coverage insurance policy or policies in the aggregate amount of at least $1,500,000 covering the Plant, including all fixtures and other property situated thereat. The Lessee shall procure such insurance from any company or companies with which Lessee carries similar insurance against similar risk. The policy or policies evidencing such insurance shall provide in the event of loss thereunder that the proceeds of the policy, at the

election of the Lessee or the Government, shall be payable to the Lessee to be used solely for the repair, restoration, or replacement of the property damaged or destroyed, any balance of the proceeds not required for the repair, restoration, or replacement of the property damaged or destroyed to be paid to the Government, and in the event that neither the Lessee nor the Government elects by notice in writing to the Insurer within sixty days after the damage or loss occurs, to have the proceeds paid to the Lessee, such proceeds shall be paid to the Government, provided, however, that the Insurer, after payment of any proceeds to the Lessee in accordance with the provisions of the policy shall have no obligation or liability with respect to the use or disposition of the proceeds by the Lessee. Nothing herein contained shall be construed as an obligation upon the Government to repair or restore the Plant or any part thereof, and the Lessee shall not be bound to expend any funds, other than those received from an insurance company, for such repair, restoration or replacement.

9. That the Plant shall be returned by the Lessee to the Government (at the time elsewhere in this Lease provided) in as good condition as when received by the Lessee, lessnormal wear and tear, except as provided for in Condition 15 hereof, and less damage to property which, under the provisions of Condition 8 hereof, the Lessee is not required to repair, restore, or replace, or damage to property covered by insurance and for which the Lessee and the Government, under the provisions of Condition 8 hereof, agree that the Government shall receive insurance funds in lieu of having the damaged property repaired, replaced or restored. In aid of its obligations so to return the Plant, the Lessee shall maintain a program for the proper use, care and maintenance of the Plant, as well as a property control and accounting system consistent with good business practice, and make repairs and replacements.

10. That the Lessee shall pay all charges for water, heat, light, gas, electric current or other utility services used by the Lessee at the Plant.

11. That upon the termination or expiration of this Lease, the Lessee shall, unless otherwise directed in accordance with the provisions of Condition 14 below, within such reasonable time as may be allowed by the Division Engineer, vacate the Plant, remove its property therefrom, subject to Condition 13 below, and restore the Plant to a condition as good as that existing when received by the Lessee, lessnormal wear and tear, except as otherwise provided for in Condition 15 below, and less damage to property which under the provisions of Condition 8 hereof, the Lessee is not required to repair, restore or replace, or damage to property covered by insurance and for which the Lessee and the Government, under the provisions of Condition 8 hereof, agree that the Government shall receive insurance funds in lieu of having the damaged property repaired, replaced or restored, and, except that the Lessee, if this Lease terminates by action of the Government under Condition 6 (c) hereof, shall not be obliged to reinstall equipment which needs in Chemical Warfare Service production lines but which Lessee may have removed and stored, or used elsewhere, in the Plant. If the Lessee shall fail or neglect to remove its property and restore the Plant, subject to Condition 13 below, as and within the time above provided, then the Division Engineer may cause the property to be removed and the Plant to be so restored, and the cost of such removal and restoration shall be paid by the Lessee to the Government on demand, and no claim for damages against the Government or its officers or agents shall be created by or made on account of such removal and restoration.

12. That the Lessee may make alterations, attach fixtures, build structures, and otherwise make changes to the Plant, without advance permission of the Government and shall retain title thereto, but no such actions of Lessee shall so change the existing facilities that the Plant cannot be restored, by the exercise of due diligence, within a period of six (6) months following termination of this Lease, to the Chemical Warfare Service production uses for which they were originally designed.

13. In the event the effective date of termination of this Lease occurs before July 15, 1951, for the cause mentioned in Condition 6 (b) hereof, the Government shall, if appropriated funds be available, pay to Lessee at that time the unamortized amount of Lessee's capital investment in the Plant made for the purpose of converting the Plant to a condition suitable for commercial operation, less a sum equivalent to Two Thousand Five Hundred dollars ($2,500.00) for each month of the Lease term elapsed prior to said termination and subsequent to the date upon which payment of rental commenced pursuant to Condition 1 hereof, the amortization theretofore charged off by Lessee for said capital investment to be computed at rates not less than those allowed under Internal Revenue tables relating

to similar capital investments. Upon payment to Lessee of such unamortized amount, title to all of Lessee's property representing said capital investment shall pass to the Government, and Lessee shall not remove, or be obliged to remove, any such property.

14. In the event of termination for the cause mentioned in Condition 6 (b) hereof at any time during the life of this Lease, the Lessee shall, if required by the Government, at the expense of the Government, use its best efforts to restore the Plant to a condition suitable for the production uses heretofore made by the Chemical Warfare Service, within six months (causes beyond the control of Lessee excepted). The Lessee's obligation in respect to this restoration shall be contingent upon the availability of appropriated funds for the purpose, and if appropriated funds are not available, the Lessee shall be under no such obligation.

15. Installed and other equipment of the Government used by Lessee which becomes worn or damaged by use so as to no longer function for the purpose for which designed shall be replaced by like items at the expense of Lessee, title to such replacements to vest in the Government; installed and other equipment of the Government not used by Lessee shall be kept in standby condition in place at the expense of Lessee according to customary good commercial practices, or, if removed, protected and stored at the Plant at the expense of Lessee according to customary good commercial practices.

16. That in the event of substantial destruction to the Plant so that it is untenantable, Lessee shall have the option of terminating this Lease on thirty (30) days written notice to the Government or canceling rent payments for the period required to restore Plant to its former condition, the date upon which the Plant is deemed to be so restored to be determined by agreement between the Lessee and the Division Engineer.

17. That, except as otherwise specifically provided in this Lease, all disputes concerning questions of fact which may arise under this Lease, and which are not disposed of by mutual agreement, shall be decided by the Division Engineer, who shall reduce his decision to writing and mail a copy thereof to the Lessee at his address shown herein. Within 30 days from said mailing the Lessee may appeal in writing to the Secretary of War, whose written decision or that of his designated representative or representatives thereon shall be final and conclusive upon the parties hereto. The Secretary of War may, in his discretion, designate an individual, or individuals, other than the Division Engineer, or a board as his authorized representative to determine appeals under this condition. The Lessee shall be afforded an opportunity to be heard and offer evidence in support of his appeal. The president of the board, from time to time, may divide the board into divisions of one or more members and assign members thereto. A majority of the members of the board or of a division thereof shall constitute a quorum for the transaction of the business of the board or of a division, respectively, and the decision of a majority of the members of the board or of a division shall be deemed to be the decision of the board or of a division, as the case may be. If a majority of the members of a division are unable to agree on a decision or if within 30 days after a decision by a division, the board or the president thereof directs that the decision of the division be reviewed by the board, the decision will be so reviewed, otherwise the decision of a majority of the members of a division shall become the decision of the board. If a majority of the members of the board is unable to agree upon a decision the president will promptly submit the appeal to the Under Secretary of War for his decision upon the record. A vacancy in the board or in any division thereof shall not impair the powers, nor affect the duties of the board or division nor of the remaining members of the board or division, respectively. Any member of the board, or any examiner designated by the president of the board for that purpose, may hold hearings, examine witnesses, receive evidence and report the evidence to the board or to the appropriate division, if the case is pending before a division. Pending decision of a dispute hereunder the Lessee shall diligently proceed with the performance of this Lease.

18. That the Lessee warrants that it has not employed any person to solicit or secure this Lease upon any agreement for a commission, percentage, brokerage, or contingent fee. Breach of this warranty shall give the Government the right to annul the Lease, or in its option to collect from the Lessee the amount of such commission, percentage, brokerage, or contingent fee, in addition to the consideration herein set forth. This warranty shall not apply to commissions payable by the Lessee upon contracts or leases secured or made through bona fide established commercial or selling agencies maintained by the Lessee for the purpose of securing business.

19. That no member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this Lease or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Lease if made with a corporation for its general benefit.

20. That all notices to be given pursuant to this Lease shall be addressed, if to the Lessee, to "Monsanto Chemical Company, 1700 S. Second Street, St. Louis 4, Missouri"; if to the Government, to the "Division Engineer, Great Lakes Division, 20 North Wacker Drive, Chicago 6, Illinois", or as may from time to time otherwise be directed by the parties. Notice shall be deemed to have been duly given if and when inclosed in a properly sealed envelope or wrapper, addressed as aforesaid, marked as registered mail, with registry fee prepaid and deposited postage prepaid (or, if mailed by the Government, deposited under its franking privilege) in a post office or branch post office regularly maintained by the United States Government.

21. That, except as otherwise specifically provided herein, the term "Division Engineer" includes his duly appointed successors and his duly authorized representatives.

In Witness Whereof I have hereunto set my hand this 28th day of June 1946, by authority of the Secretary of War.

R. C. Crawford
R. C. Crawford, Brigadier General
Acting Chief of Engineers

This Lease is also executed by the Lessee this 1st day of July, 1946.

Signed and sealed in presence of

Blanche Dunnavant
Blanche Dunnavant

Amelia Scannell
Amelia Scannell

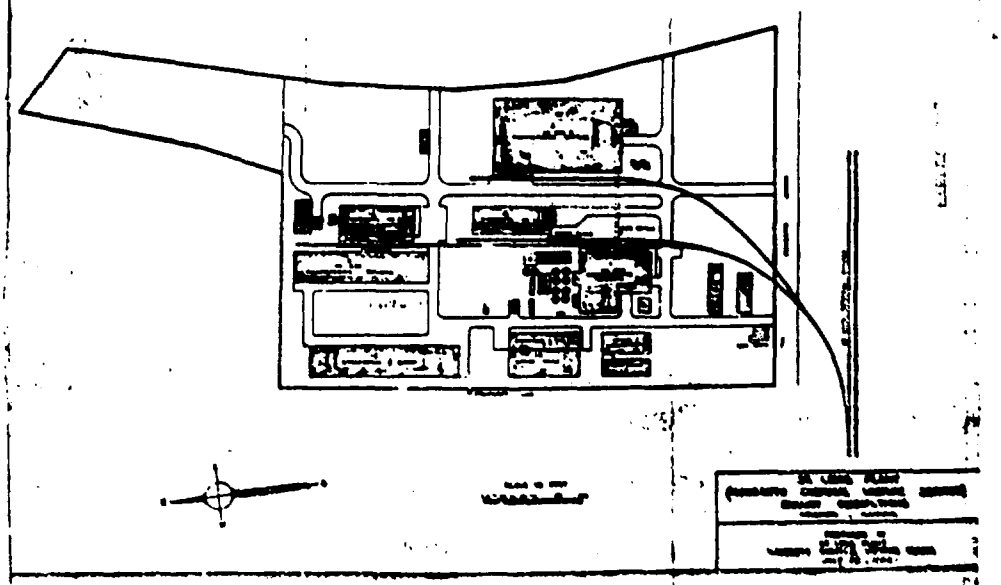
Monsanto Chemical Company

By Osborne Bezanson
Vice President

Certificate

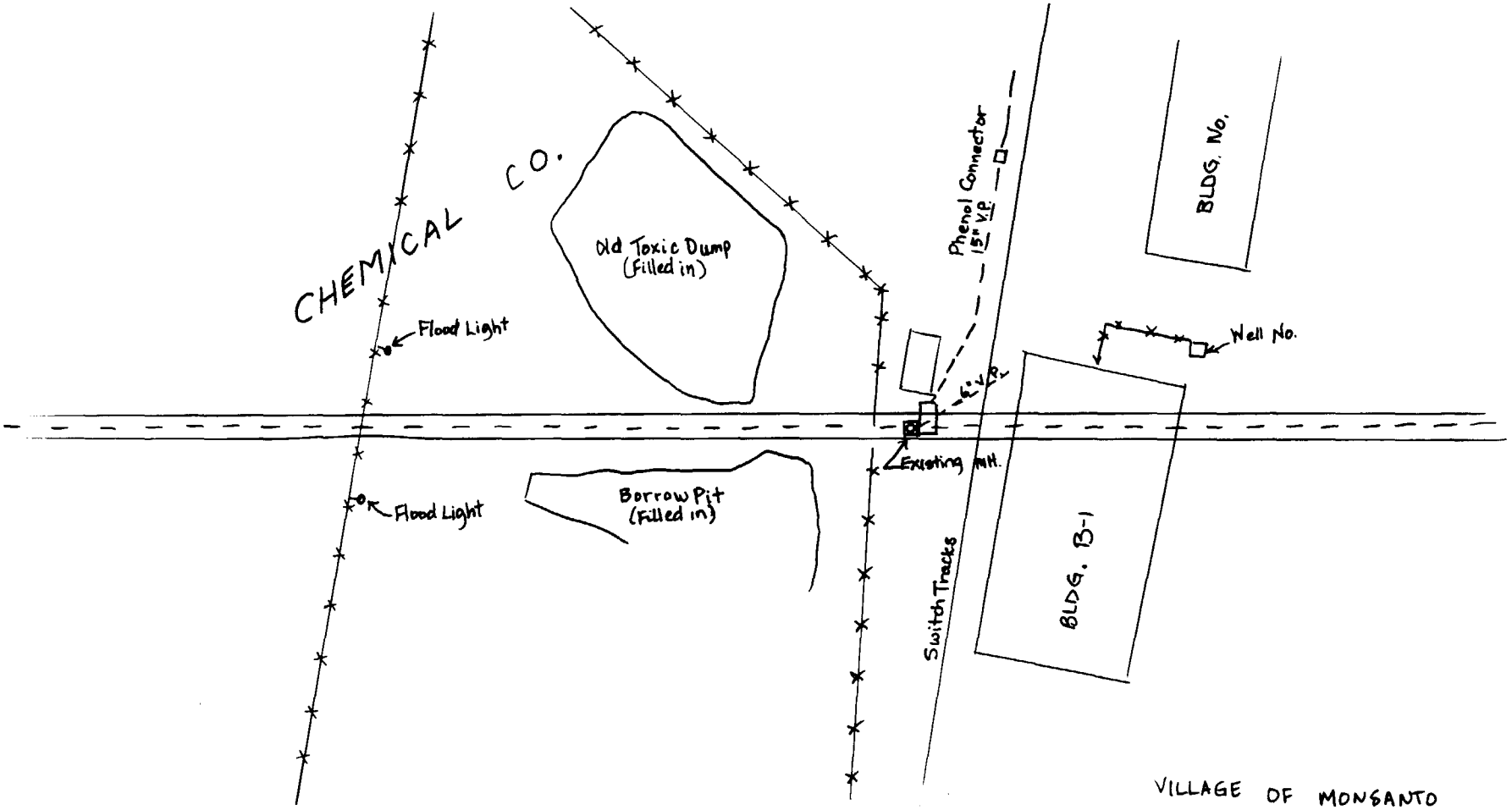
I, C. E. Caspari, Jr., certify that I am the Assistant Secretary of the corporation named as Lessee herein; that Osborne Bezanson who signed this Lease on behalf of the Lessee, was then Vice President of the corporation; that said Lease was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

(Corporate Seal) C. E. Caspari, Jr. Corporate Seal



File: for report this 18th day of November A.D. 1946 at 3:17 P.M. Instr. #[illegible]

Exhibit 59



VILLAGE OF MONSANTO
EXTENSIONS & IMPROVEMENTS
PUBLIC SEWER SYSTEM

BC McCurdy - Consulting Engineer
July 1945

Exhibit 60

EAST ST. LOUIS—Mississippi River
Monsanto Chemical Company

October 24, 1947

Monsanto Chemical Company
Attention: J. P. Stickley
Assistant Plant Manager
Monsanto, Illinois

Gentlemen:

Attached please find results of analysis of waste water samples collected at your Monsanto plants by our Engineer A. F. Troemper on October 7, 1947.

You will note from the results of analysis that both of the sewers from the north plant had a relatively low threshold odor value and a low phenol concentration. However, the sample collected from the south plant sewer indicates a high threshold odor value and a high phenol concentration present in these wastes.

In view of the fact that the wastes from the south plant sewer might seem to be objectionable from the standpoint of causing tastes in fish in the river, it is believed that further investigation of this waste water system should be undertaken. We should like to suggest a conference between our representative and representatives of Monsanto Chemical Company in the near future to further discuss this problem and to formulate means for additional investigation of it or control measures to be applied. We should like to suggest that the meeting be held at your Monsanto plant some time during the week of November 3. Kindly advise the date and time most suitable.

We appreciate the courtesies extended our engineer at the time of his October 7 visit and trust that we may continue to have your excellent cooperation.

Very truly yours,

Technical Secretary

APT:mmm
Enc.

MONSANTO CHEMICAL COMPANY

ORGANIC CHEMICALS DIVISION
MONSANTO, ILLINOIS

October 28, 1947

RECEIVED
OCT 30 1947
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

AIR MAIL

Mr. C. W. Klassen
Technical Secretary
State of Illinois
Sanitary Water Board
Springfield, Illinois

Dear Mr. Klassen:

In reply to your letter of October 24 requesting a meeting with Monsanto representatives, we would prefer to have the members of your department visit us on Wednesday, November 5. If you will be kind enough to let us know what time we can expect you, arrangements will be made for the necessary conference room.

We wish to assure you of our continued cooperation in this matter.

Very truly yours

Jos. F. Stickley

Jos. F. Stickley
Assistant Plant Manager

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MONSANTO CHEMICAL COMPANY

ORGANIC CHEMICALS DIVISION
MONSANTO, ILLINOIS

December 12, 1947

Mr. A. P. Troemper
State Sanitary Water Board
Springfield, Illinois

Dear Mr. Troemper:

Pursuant to our meeting early in November, our laboratory has been experimenting with the information furnished by you covering the determination of odor and phenol in waste water. Following some preliminary work, testing of our sewers was begun during the last week of November and has progressed far enough for us to discuss our experience in a general way.

Most of our analyses so far have been obtained upon samples taken from the main sewer box directly east of Highway No. 3 because at this point we are able to obtain waste water representative of the entire plant. At this point our calculated flows are 7300 gallons per minute which comprises the entire flow from the Plant B south area plus the waste from the Village of Maplewood, Illinois and Lewin Metals Corporation.

Following your standard procedure we have found threshold odors varying between 4 and 200 with an average of approximately 50. No threshold odor concentration has as yet been established and therefore we are unable to compare our results with the "odor value" shown in the report of Mr. J. Weart submitted to us with your letter of October 24, 1947. We classify the odor characteristics as "chemical" in accordance with Table 6 - Odor Characteristics.

Following the procedure for determination of phenols by bromination, results have varied from 25 ppm. to approximately 200 ppm with an average of 100 to 150 ppm. These results as well as the method have been studied carefully and we are convinced that the bromine reagent consumed in the reaction is greatly increased by the presence of reducing substances other than phenols in our waste water. Values have been determined for these reducing substances (which are inorganic in nature) and on a limited number of tests we find a phenol content below 30 ppm. We likewise find that well water collected directly from our underground wells shows a threshold odor number of 1 and a bromine titration which would indicate 8 ppm. of phenol. Of course this latter figure

does not represent the true condition in that our well water is definitely free from phenol and the bromine reagent consumed is the result of iron and miscellaneous inorganic materials. All of these data are subject to much more intensive study and are presented principally to acquaint you with our activities to date.

We are continuing to work on this problem on a regular basis and would appreciate your comments with respect to the phenol content of approximately 20 to 30 ppm. which might be possible from our tests. Meanwhile studies are being made of possible remedial measures should we find concentrations in excess of reasonable industrial practice.

We wish to assure you of our interest in this investigation and shall keep you informed as to our progress.

Very truly yours

Jos. F. Stickley

Jos. F. Stickley
Assistant Plant Manager

JFS:EF

MONSANTO CHEMICAL COMPANY

ORGANIC CHEMICALS DIVISION
MONSANTO, ILLINOIS

March 1, 1948

Mr. A. Paul Troemper
State Sanitary Water Board
Springfield, Illinois

Dear Mr. Troemper:

We were very pleased to hold the emergency discussion with you on February 27, 1948 covering the complaint received at your office on February 26 involving a foreign taste in fish taken from the Mississippi River in the vicinity of Grand Tower. As I reported to you, Monsanto was in the process of preparing a report of our analyses of waste water discharged from the Monsanto, Illinois Plant. A tabulation of our results covering the months of December 1947, and January and February 1948 is attached to this letter. As you know these results were obtained in every case on samples taken from the main sewer adjacent to Highway No. 3, which sewer carries all Plant B effluent to the river. The tests themselves were made in accordance with the Illinois Sanitary Water Board method incorporating the use of borax as suggested by us and agreed upon by Mr. Weart in our meeting of January 14. The threshold odor tests were made in strict conformance with the Illinois Sanitary Water Board procedure.

As you and Mr. Weart requested on January 14, we have carefully checked the Illinois Sanitary Water Board method for phenol on monochlorphenol and dichlorphenol and find that it applies equally as well for the quantitative determination of chlorphenols as for phenol. The results shown in the analyses therefore report both the phenol and any chlorphenol present in the waste water.

From a careful review of the data attached we conclude that the phenol content is well within safe limits and further, that there is no evidence of a change in the waste water impurities, or in organic, phenolic, or chlorphenolic content over the period December 1, 1947 to February 26, 1948. Assuming that the foreign taste observed in the fish is genuine, there are evidently factors responsible other than waste water from Monsanto Chemical Company. In our meeting of February 26 we developed the following possible causes:

1. Rapid runoff of sewage water to streams feeding the Mississippi due to thawing at the ground surface only.
2. Build up in streams feeding the river of putrefying vegetation, wastes, sewage, garbage, etc.
3. Slow oxidizing conditions for such waste due to cold weather, ice, snow, and general inactivity of bacteria under present conditions.

RECEIVED
MAR 3
Division of Sanitary Engineering
Illinois Dept. Public Health

In accordance with our discussion we shall continue to sample and analyze our waste water by the agreed-upon method during March and review with you our results on about April 1. Meanwhile we plan to keep in contact with you concerning any further developments.

Wishing you and Mr. Weart our kindest personal regards,

Sincerely

Jos. F. Stickley

Jos. F. Stickley
Assistant Plant Manager

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Att. 3

RECEIVED
MAR 3 1948
ILLINOIS DEPT. OF PUBLIC HEALTH
SANITARY ENGINEERING DIVISION

DECEMBER

PHENOL (Parts per million)	THRESHOLD ODOR NUMBER AND CODE
47	4 C
36	91 Ch
98	3 Ch
148	5 Ch
98	5 Ch
89	4 Ch
49	5 C
85	200 Ch
19	18 CA
59	7 Ch
59	10 C
63	18 Ch
51	60 Ch
50	7 C
31	60 Ch
Average 66	33

JANUARY

	PHENOL (Parts per million)	THRESHOLD ODOR NUMBER AND CODE
	58	60 C_{SO_2}
	81	30 AC_{SO_2}
	171	100 A
	83	200 C
	59	10 C
	83	400 ChC_{SO_2}
	67	400 ChC_{SO_2}
Average	86	171

SERVING INDUSTRY
WHICH SERVES MANKIND

RECEIVED
MAR 3 1948
PROVINCE OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

FEBRUARY

PHENOL (Parts per million)	THRESHOLD ODOR NUMBER AND CODE
138	800 Ch
76	200 CA
106	400 CA_{SO_2}
37	90 C_{SO_2}
158	90 CA
50	30 CA
90	60 C_{SO_2}
71	99 CA
69	40 C_{SO_2}
58	400 C_{SO_2}
46	40 C
61	60 C
90	200 CA
46	90 C_{SO_2}
Average 78	185

RECEIVED

MONSANTO CHEMICAL COMPANY

ORGANIC CHEMICALS DIVISION
MONSANTO, ILLINOIS

April 9, 1948

Mr. A. Paul Troemper
State Sanitary Water Board
Springfield, Illinois

Dear Mr. Troemper:

In accordance with our discussion on February 27, 1948, we are sending to you a tabulation of our analyses of the waste water effluent from the Monsanto, Illinois Plant for the month of March. The results show an average Phenol Content of 87 parts per million and a Threshold Odor Number of 184 in March. These compare favorably with the corresponding values of 85 and 190 respectively for February.

We shall continue to sample and test the effluent water during April or until such a time as we hear from you. Any suggestions from your office or any information regarding new developments would be appreciated by us.

Very truly yours

Jos. F. Stickley

Jos. F. Stickley
Assistant Plant Manager

ef

Att.

SEWER ANALYSES - MARCH 1948

DATE	PHENOL (Parts per Million)	THRESHOLD ODOR NUMBER AND CODE
3/1/48	112	30 C_{SO_2}
3/2/48	81	40 CA
3/4/48	40	99 CA
3/5/48	83	800 Ch
3/7/48	94	200 C
3/8/48	108	61 C_{SO_2}
3/10/48	46	153 C_{SO_2}
3/11/48	51	22 C_{SO_2}
3/12/48	48	800 C_{SO_2}
3/15/48	83	18 CA
3/16/48	70	60 CA
3/17/48	140	60 CA
3/18/48	65	14 CA
3/20/48	120	90 CA
3/23/48	67	400 CA
3/24/48	123	153 C_{SO_2}
3/27/48	80	90 C
3/28/48	63	200 CA
3/30/48	180	200 C_{SO_2}
AVERAGE	87	184

MEMORANDUM

EAST ST. LOUIS—Mississippi River
Monsanto Chemical Company

Date: April 19, 1948

Interviewed: Joseph F. Stickley, Assistant Plant Manager

A conference was held with Mr. Stickley on the above date regarding sampling of the plant sewers from Monsanto Chemical Company. Mr. Stickley advised that they had continued their sampling and analyses for phenol and threshold odor. He was advised that in view of the over-all survey planned for the Mississippi River in the St. Louis-East St. Louis area that it was thought that Monsanto could discontinue their sampling program if they considered it advisable.

A new process regarding extraction of phenols was discussed with Mr. Stickley. This process was mentioned in a review of the literature in SEWAGE WORKS JOURNAL and consisted of an article by S. A. Nesmeyanov, "Extraction of Phenols from Sewage Wastes by Phenosolvan," Gigiena I. Sonit (U.S.S.R.) 127, 8 (1947) C.A. 41, 7595a. The phenosolvan consists of an insoluble mixture of higher aliphatic alcohols and up to 85 per cent butyl acetate. 99 per cent recovery of certain phenols is claimed. The phenosolvan is almost completely recovered by distillation. A method of recovering the extracting agents used in recovering phenolic compounds is described by A. Dierichs, "Recovery of Extraction Agents for Phenolic Compounds," U. S. patent 2,415,087 (1947).

Mr. Stickley advised that they had not had any experience with any substance such as phenosolvan for recovery of phenols and did not know whether it would be practical for their particular process. He advised that most of the Russian material printed in the literature was virtually worthless and could not be duplicated in the laboratory. He advised, however, that they would look up the article and attempt to duplicate the process in order to learn whether it had any possibilities for use in the recovery of phenols from their process. He advised that he would write regarding the results that they had obtained after their work had been completed.

A. P. Troemper
Principal Sanitary Engineer

APT:ew

Exhibit 61

[illegible] WATER BOARD
WATER POLLUTION INVESTIGATIONS
Industrial Wastes - Miscellaneous

Plant Monsanto Chemical Co. City Monsanto Ref. No.
District County St. Clair Main Watershed Mississippi
Address Monsanto, Ill. Sub-watershed
Informant W. S. Webus Title Plant Manager Industry Chemical
Plant Operation: Hrs. per Week Days Per Year Plant Employees

Average	168	365	2,100
Maximum	168	365	2,300

Seasonal variations None

WATER SUPPLY:

	Source	Av. G.p.d.	Max. g.p.d.	Treatment
Drinking	E.St.Louis Interurban	2,700,000	3,200,000	None
Industrial	"			Lime-soda for boiler feed water.
Cooling	Deep Wells	16,500,000	18,000,000	None

RAW MATERIALS: Salt; sulphur; benzene; other miscellaneous organic and inorganic chemicals.

Chemicals

PRODUCTS: Sulfuric acid; chlorine; caustic soda; phenol; chlorinated compounds and other organic and inorganic chemicals.

(1) WASTES: Quantity 1,500,000 industrial & 16,500,000 cooling water How estimated Based on water consumption.
Character: Washings sanitary wastes. Acid
Process Alkali
Disposal other than water-carried Organic waste solids and liquids burned or placed on dump.
Possible spills Possible. Precautions taken.
Segregation of Strong Wastes
Difficulties [illegible].
Treatment None. Pilot treatment plant in operation at other plant. (No data available).
Analyses: Number Date By whom
Appearance Tan color; slight turbidity.

(2) OUTLET: Where to Monsanto sewer system.

Description:	Size & shape	Material	Location	Elevation
1.	24"	V. tile	South of plant	All join & go to Monsanto pumping station.
2.	36"	V. tile	South of plant.	
3.	30"	V. tile	North of plant—Monsanto Ave.	

Gauging possibilities Manholes throughout system.
Conditions below outlet: Color Turbidity Deposits
Condition Miles below plant

SANITARY SEWAGE: Disposal Monsanto sewer system Persons tributary 2,100

REMARKS Processes so varied that data on individual process wastes is not available.

Survey by W. S. Budd Date 8/1/51

POPULATION EQUIVALENT COMPUTATIONS Sampling needed to make following computations.
Factors used per B.O.D. S.S.
Population Equivalent based on B.O.D. ; S.S.
P.E. based on
Computation by Date

MONSANTO CHEMICAL COMPANY

(1) Possible Wastes in Waste Water.

pH about 7.0.

Inorganic	Organic
Sodium Chloride	Phenolic Compounds
Sodium Sulfate	Minor quantities of organic residual (composition unknown)
Sodium Sulfite	
Sodium Bicarbonate	
Calcium Sulfate (Gypsum)	
Calcium Chloride	

(2) This plant has numerous outlets, size 8" to 16", discharging to the three village sewers listed on the opposite page.

Participants in conference:

W. S. Wobus, Plant Manager
D. B. Hoemer, Assistant Plant Manager
R. K. Flitcraft, Development Engineer
J. R. Donavan, Development Group Leader

Exhibit 62

C.W.B.

September 21, 1956

MONSANTO CHEMICAL COMPANY

Mr. R. . Hodges
Pollution Control Engineer
Monsanto Chemical Company
Monsanto, Illinois

Dear Mr. Hodges:

Engineer W. A. Hasfurther has reported on his conference September 13 with Messrs. Graves, Wobus and yourself at William G. Krummrich Plant of Monsanto Chemical Company. His visit to the plant and observation of your waste sampling procedures has given us a better understanding of your waste elimination and control problem.

It is certain that you have already reduced the amount of objectionable constituents discharging to the sewers and the sampling program that you are instituting should enable further reductions. Our staff is quite interested in the portable sampler that you developed using air compression tank and we would appreciate a detailed sketch of it. We commend you upon the work you have done to improve the accuracy and reliability of automatic sampling at the plant.

On the basis of Mr. Hasfurther's discussion with you we approve of your sampling plans and in order to give further study to your needs and assist you, if we can, the Board requests the following information from Monsanto Chemical Company:

1. A complete layout of the main sewers of the Krummrich Plant indicating the location of all existing and proposed sampling points.

2. A general designation of the important processes contributing or of the wastes going into each section of main sewer.

3. A summary of analytical results to date. This can be given as an average of all data collected up to this time but in the future we request that monthly reports to submitted giving the results for each day samples are collected. When flows are measured this information should be included.

4. An outline of progress during the past year to eliminate concentrated wastes.

Mr. Hasfurther hopes to assemble and study reports on chemical wastes during the next two months and after reviewing your reports carefully will arrange to meet with you and discuss any improvements that we feel may be

necess[illegible] [illegible]ur waste co[illegible]rol planning or sampling program.

[illegible] [illegible]ours,

[illegible]

[illegible] [illegible]ner
[illegible] [illegible]al Secretary

:mn

cc - [illegible]

Monsanto Chemical Co.

MONSANTO CHEMICAL COMPANY

WILLIAM G. KRUMMRICH PLANT
ORGANIC CHEMICALS DIVISION
MONSANTO, ILLINOIS

October 18, 1956

Mr. William J. Downer
Acting Technical Director
State Sanitary Water Board
Springfield, Illinois

Dear Mr. Downer:

We have compiled the information which you requested in your letter of September 21, 1956, following Mr. William A. Hasfurther's visit to our plant on September 13, 1956. Attached are the following:

(1) A layout of the main sewers of the Krummrich Plant which shows our relationship to the Village of Monsanto sewer system. Our four sampling points are indicated on the layout. Each important process contributing wastes is shown by blocks together with the main sewer lines receiving the wastes. Historically, rapid growth of our plant has required additional sewer capacity from time to time. This was provided in many cases by new lines laid roughly parallel to existing lines with cross connections to equalize flows. Because of this mixing of wastes, it is frequently impossible to state which sampling station collects samples representing the wastes from a particular process.

(2) A summary of analytical results to date. Sampling is now being done on a 24 hour continuous basis four days per week. No samples representing Friday, Saturday, or Sunday wastes are collected. However, amount of wastes should be less on Saturday and Sunday because some of our operations are reduced over weekends. Determinations of pH and percent phenols are being made daily on the sample from each of the four stations. Determination of free acidity, chemical oxygen demand and threshold odor number are being made on a weekly composite of the four daily samples from each station.

Mr. William J. Downer October 18, 1956

No flow data is yet available. Our sewer system layout does not permit accurate measure of flows by conventional means such as use of flumes or weirs. We plan in the very near future to attempt flow measurements by a dilution method using Lithium Chloride which is foreign to our wastes. We will inject a LiCl solution of known strength at known rate at an upstream point and measure its dilution downstream after thorough mixing in the waste stream. Preliminary laboratory work here indicates that reasonably accurate tests can be made with dilutions as low as 5 p.p.m. as Lithium. As soon as reliable results are obtained, we will report them.

We would appreciate any suggestions you may have regarding possible methods of measuring flows in our sewer streams.

(3) An outline of our recent progress to eliminate wastes. Total cost of the projects involved was $267,000.

(4) A detailed sketch and explanation of the continuous vacuum sampler which we developed. If you plan to build one for your use you can obtain the stainless steel vacuum tank for $8.25 plus postage from the A.C. Tank Company, Department 160, P.O. Box 389, Burlington, Wisconsin. The tank description is "Model A-2, 6"x24' magnetic type stainless steel". The sight feed bubbler is manufactured by the Meriam Instrument Company, 10920 Madison Avenue, Cleveland 2, Ohio. It is a Model No. C-1241 Sight Feed Bubbler. Other parts are readily obtainable.

If you have any questions regarding fabrication or use of the sampler, I will be glad to assist in any way possible.

We will be pleased to meet again with Mr. Hasfurther after he has reviewed our reports and will be pleased to receive any suggestions you may have for improvement in control of our wastes.

Very truly yours,

Paul B. Hodges

Paul B. Hodges
Pollution Control Engineer

PBH/dd

SUMMARY OF RESULTS FROM ANALYSES
OF
SEWER WATERS

RECEIVED
OCT 25
DIVISION OF SANITARY ENGINEERING
NYS DEPT OF PUBLIC HEALTH

Sampling Station No. 1 - 30" Sewer

Samples collected from 6/6/56 - 10/12/56 -
54 samples.

Numerical Average of Analyses

pH	-	3.1
Chemical Oxygen Demand	-	641 p.p.m.
Threshold Odor Number	-	33
Free Acidity	-	427 p.p.m.(1)
Phenols	-	87 p.p.m.

(1) Not true average because 6 of the 54 samples showed negative free acidity. These negative values were not included in the average.

Sampling Station No. 2 - 24" Sewer

Samples collected from 7/12/56 - 10/12/56 -
33 samples.

Numerical Average of Analyses

pH	-	4.3
Chemical Oxygen Demand	-	318 p.p.m.
Threshold Odor Number	-	34
Free Acidity	-	238 p.p.m.(1)
Phenols	-	35 p.p.m.

(1) Not true average because 13 of the 33 samples showed negative free acidity. Figure shown is average of the 20 samples showing free acidity.

Sampling Station No. 3 - North Area - West

Samples collected from 9/18/56 - 10/12/56 - 13 samples.

Numerical Average of Analyses

pH	-	2.4
Chemical Oxygen Demand	-	1,820 p.p.m.
Threshold Odor Number	-	80
Free Acidity	-	1,870 p.p.m.(1)
Phenols	-	65 p.p.m.

(1) Negative free acidity of one day's sample not included in average.

Sampling Station No. 4 - North Area - East

Samples collected from 9/18/56 - 10/12/56 - 15 samples.

Numerical Average of Analyses

pH	-	3.0
Chemical Oxygen Demand	-	402 p.p.m.
Threshold Odor Number	-	53
Free Acidity	-	1,140 p.p.m.(1)
Phenols	-	11 p.p.m.

(1) Negative free acidity of one day's sample not included in average.

RECENT PROJECTS RESULTING IN DECREASE OF POLLUTION

(1) Sodium Sulfite Recovery

(a) By-product sodium sulfite was being sewered because recovery facilities were inadequate. New recovery, drying and handling facilities were installed in November, 1955.

(b) Impure solution of sodium sulfite which was "mother liquor" from the sodium sulfite recovered in (1) above was being sewered. Arrangements were made for sale of this impure solution at a reduced price so facilities were installed for handling the solution in August, 1956.

(2) Increase Recovery of Phenol

(a) Process study by technical personnel was made at the Phenol producing department to pinpoint sources of loss and to take corrective action. Extensive alterations were made as a result of the study. Original study completed in June, 1956 and has now been resumed to further reduce losses.

(b) In a Phenol using department, excess phenol in the reaction was sewered. Equipment to collect and recycle the phenol was installed in May, 1956.

(c) In a Phenol using department involving chlorination of phenol, off-gas from the reaction was sewered. This gas was rich in phenolics. Gas scrubbing equipment was installed and other alterations were made to sharply reduce contamination from this source. Project was completed in April, 1956.

(3) Increase Recovery of Benzene and Toluene

(a) In the chlorinated benzol departments, several changes were made to improve cooling of vent gases containing benzene and chlorobenzene. A substantial reduction was accomplished. Completed in April, 1956.

(b) In the chlorinated toluene department, vent gas containing toluene was sewered. A refrigerated condenser was installed which removed nearly all of the vapors. The project was completed in June, 1955.

(4) Reduce Loss of 2,4 - Dichlorphenoxyacetic Acid

Wooden trough settlers for separating crystals of 2,4 - D from the mother liquor were not as effective as desired so that some of the crystals went to the sewer. The wooden troughs were replaced with Haveg tanks. Completed May, 1955.

(5) Shut Down DDT Operations

Large scale production of DDT using a comparatively low yield process necessitated sewering organics including chloral, chlorobenzenes, ethyl alcohol and some DDT. Operations were suspended indefinitely in February, 1956.

CONTINUOUS VACUUM WATER SAMPLER

Continuous sampling of water or sewage wastes is frequently necessary at locations where electric or air power is not readily available. In other locations, extreme depth of sewers and presence of corrosive or flammable vapors may make use of electrical equipment inadvisable. A low cost, dependable, corrosion-resistant vacuum sampler was developed to overcome these common difficulties.

The tank (1) is evacuated to 20 mm.Hg. (or less) by taking the unit, which is readily portable, to a vacuum source such as a laboratory pump or multi-stage steam ejectors and connecting hose (3) to the source. The evacuated unit is returned to the sampling site and connected to the filter flask (13) which should be suspended in the sewer manhole out of direct sunlight. The polyethylene tube (15) from the sewer runs through the side arm into the flask so that the water flow rate is readily visible and so that siphoning cannot occur. The filter flask is then evacuated by means of the hand pump (10) to the point where water barely starts to drip from the tip of the tubing (15). Too high vacuum can be relieved slowly by the needle valve vent (9) until the desired flow is attained. Valve (6) is closed and the sampling continues by displacement of air through the sight-feed bubbler with needle valve (5) into the vacuum tank (1). The needle valve (5) is adjusted to give the flow desired. This adjustment need never be changed unless dirt or water is inadvertently drawn into the valve.

With the unit shown, sample sizes can be controlled from one to three liters in 24 hours. If larger samples are desired, larger vacuum tanks should be used. In order that the sampling rate be reasonably constant over the 24 hour period, the vacuum tank volume should be greater than twice the sample size desired and the filter flask should be protected from extreme temperature changes.

To discourage tampering, the hand vacuum pump can be disconnected daily and a cover locked over the bubbler, valves and gage.

In extremely cold weather, a small air drier should be inserted into the tubing line (12) near the flask to prevent ice crystals clogging the bubbler needle valve.

Total materials cost for each unit, including the hand vacuum pump, is about $55.

In our installation, four samplers were installed and a small gasoline engine powered vacuum pump on a station-wagon was provided, eliminating the necessity for moving the samplers. The four sampling stations, although nearly a mile apart, can be tended in a total of about 45 minutes per day including taking the samples to the laboratory.

Exhibit 63

Exhibit 63

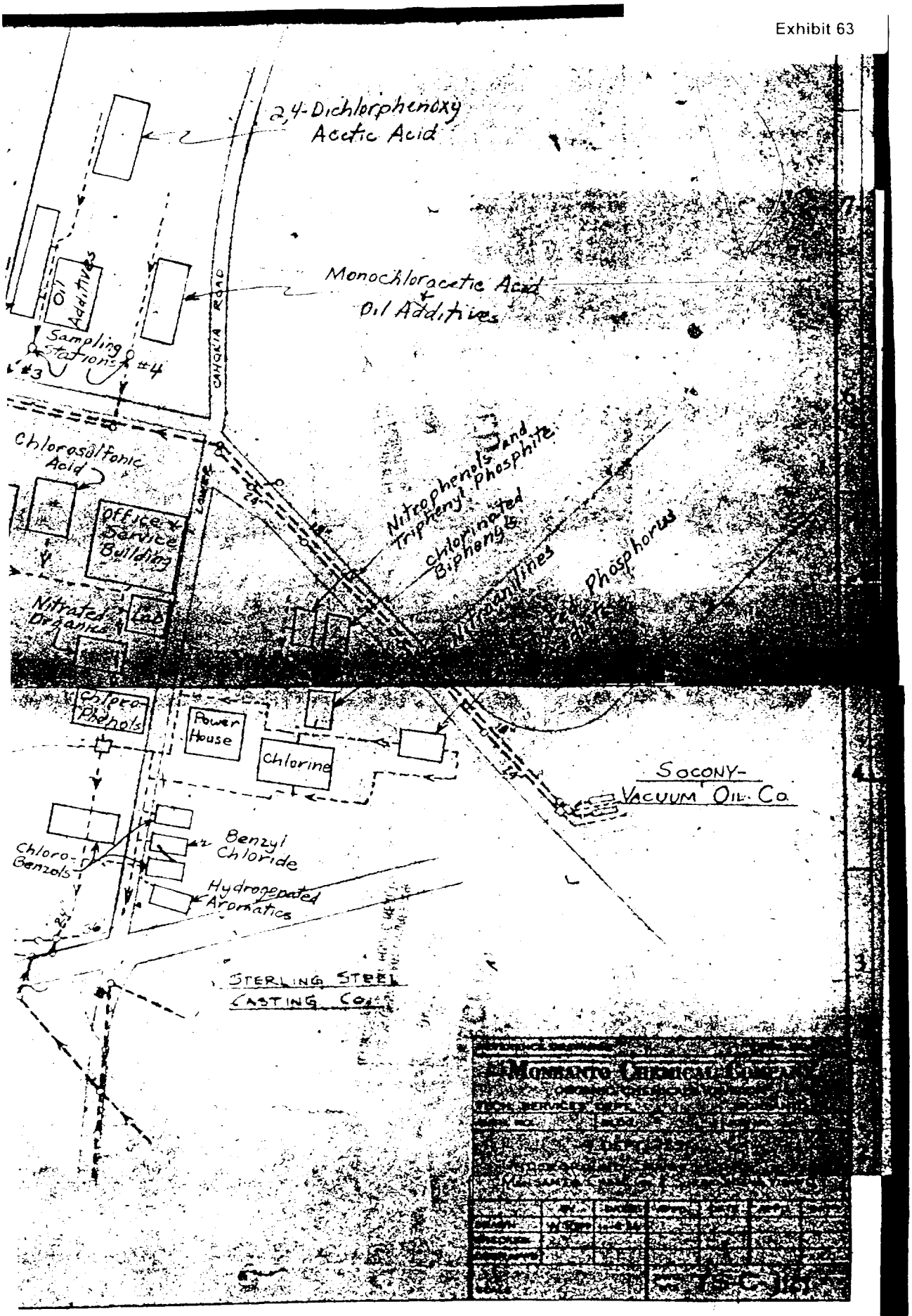

2,4-Dichlorphenoxy Acetic Acid
Monochloracetic Acid + Oil Additives
Oil Additives
Sampling Stations
#3
#4
CAYUGA ROAD
Chlorosulfonic Acid
Office & Service Building
Nitrated Organics
Lab
Nitrophenols and Triphenyl Phosphite
Chlorinated Biphenyls
Nitroanilines
Phosphorus
Chloro-Phenols
Power House
Chlorine
SOCONY-VACUUM OIL CO.
Benzyl Chloride
Chloro-Benzols
Hydrogenated Aromatics
STERLING STEEL CASTING CO.
MONSANTO CHEMICAL COMPANY

Exhibit 63

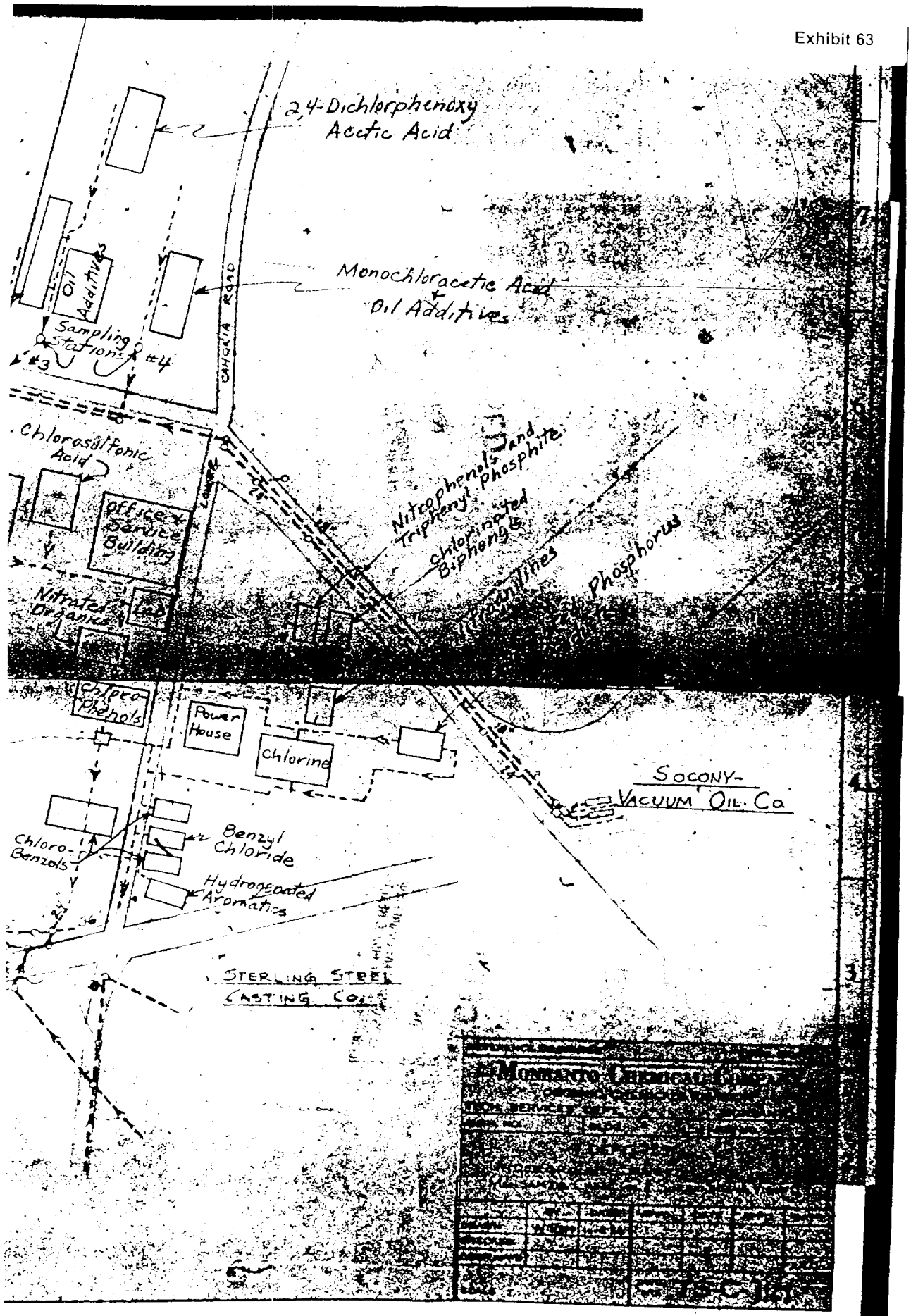

2,4-Dichlorphenoxy Acetic Acid
Monochloracetic Acid + Oil Additives
Oil Additives
Sampling Stations
#3
#4
CHURCH ROAD
Chlorosulfonic Acid
Office & Service Building
Nitrated Organics
Lab
Nitrophenols and Triphenyl Phosphite
Chlorinated Biphenyls
Phosphorus
Chlora Phenols
Power House
Chlorine
SOCONY-VACUUM OIL CO.
Chloro-Benzols
Benzyl Chloride
Hydrogenated Aromatics
STERLING STEEL CASTING CO.
MONSANTO CHEMICAL COMPANY

Exhibit 64

MONSANTO CHEMICAL COMPANY

WILLIAM G. KRUMMRICH PLANT
ORGANIC CHEMICALS DIVISION
MONSANTO, ILLINOIS

July 29, 1957

Mr. Carl Groce, Sanitary Engineer
Illinois Sanitary Water Board
State Capitol Building
Springfield, Illinois

Dear Carl:

When we last met in Jack Garrett's office, you mentioned that you would like to have a copy of the talk I made at the recent Industrial Waste Conference in Kansas City, Missouri. This talk is enclosed - it is shortened somewhat and simplified because references to the slides shown were deleted. These slides showed some of the gadgets developed and pictures of some of the actual waste reduction projects. I would appreciate any suggestions you may have on the talk or on our program for waste reduction.

I enjoyed visiting with you in Jack's office. Please feel free to drop in any time you're down this way.

Sincerely yours,

Paul B. Hodges

Paul B. Hodges
Pollution Control Engineer

PBH/emz

WASTE REDUCTION IN A CHEMICAL PLANT

These are the experiences of a large chemical plant in its waste reduction program. Many types of industries, other than chemical, will receive copies of this paper. However, the same principles and the same techniques that we have found useful can be applied to most industrial waste reduction programs.

Background

Let's look at the background of our plant with respect to the stream pollution problem. The W. G. Krummrich Plant of Monsanto Chemical Company is situated opposite St. Louis on the Illinois side of the Mississippi River about one mile from the river. We produce about 65 chemical products simultaneously, derived mostly from the basic raw materials salt, sulfur, and benzene. From salt we produce chlorine and sodium hydroxide, from sulfur we produce large quantities of sulfuric acid. From benzene and the caustic, chlorine and nitric and sulfuric acids are derived the wide variety of organic intermediates that make up most of our production.

In most chemical processes, besides the products desired, come by-products, often useless or in quantities so small that recovery is not economically justified. Also, usually an excess of one or more of the ingredients must be added to make the chemical reaction proceed smoothly so the final product must be separated from both the by-products and the unreacted ingredients. Chemical plants normally, therefore, have highly complex problems of waste disposal involving several times the number of different materials actually produced for sale.

Like most chemical plants, we use fairly large quantities of water for cooling and processing so that these waste materials are usually quite diluted. This, of course, makes recovery and reuse very difficult.

We have always been interested in minimizing wastes and recovering by-products because that's good business. With the stiff competition since the end of the war, it has been necessary to continually increase the output of finished goods from a given quantity of raw materials in order to meet this competition. Yields which were considered quite acceptable a number of years ago are now substandard.

Monsanto as a company has always strived to be a good neighbor and to be accepted in all of the communities in which we operate. In our plant we have been careful to treat known toxic wastes such as cyanides to make them harmless before sewering and to minimize sewering of any wastes which might be objectionable.

Our wastes are discharged through four main sewers into the sewer system of the industrial municipality (Monsanto Village) of which we are a part. The village sewer flows are collected at a pumping station which discharges into the Mississippi River.

The Mississippi River in the St. Louis Metropolitan area is a highly valuable asset serving a number of purposes. It is a source of public and industrial wate supplies, it is an important artery of transportation, it is a playground above St. Louis and it also serves a very necessary function as the waste disposal facility for the entire Metropolitan area. Both municipal and industrial wastes, largely untreated, are presently discharged into the river from about 200 outfalls.

The Mississippi River is very large -- its average flow at St. Louis is 167,000 Cubic Feet per second, so dilution of the wastes is great and any deleterious effects from the wastes are not too obvious. However, there was a general realization that a pollution problem existed in the Mississippi. There had been complaints from commercial fishermen south of St. Louis that they couldn't sell their fish because of an off-flavor and the fishing industry almost died out. A number of the municipal water treating plants in the St. Louis area had complaints on odor and taste and could not remove the odor by conventional treating methods. The floating solids and sludge banks were unsightly and were smelly in the summer time.

In 1949, Missouri and Illinois formed the "Bi-State Development Agency" for the planning and development of the St. Louis Metropolitan Area. The Bi-State Agency took on the job of studying pollution in the Mississippi. It was assisted by the U. S. Public Health Service, the Illinois Sanitary Water Board and the Missouri Division of Health. The study was made over a two year period in 1951 and 1952. They took regular samples at points in the river over a 35 mile stretch. They sampled and tested many of the sewer outfalls. They tested the bacteria and studied the marine plants and animals in the river. They even set up aquaria where they put test fish along with water from the river or from sewer outfalls. They cooked and taste tested the fish to try to see where the off-flavors were picked up.

The findings from the survey were completed and published in 1955. There were many findings but the most important ones were:

1. The lateral zones were the most polluted and mixing in the river was poor. A pollutant going into the river from a sewer outfall would go for many miles before it became well mixed through the river.

2. There was a wide range of industrial wastes. The most important effects at present were in the tastes and odors of the fish and water taken from the river.

3. There had been a sharp reduction (about 75%) in commercial fishing since 1947 -- mostly due to economic conditions rather than pollution. However, the stream conditions were not favorable for fish food and propagation.

4. The industrial municipality sewer to which we contribute discharged phenolic pollution which is considered objectionable -- very small amounts of phenols, especially chlorophenols, are believed to give a bad taste to water and fish.

There were a large number of recommendations in the report but the ones most significant were:

1. General recommendation - that all wastes should be in such condition that they would not harm the river as a source of domestic and industrial water supply or for navigation, fish and wild life, recreation, agriculture and other normal stream use.

2. That sanitary sewage and storm water should be settled to remove the solids.

3. That phenolic chemical wastes should be treated so that the phenol content of the river at any point after original dilution was not over 2 p.p.b. average or 5 p.p.b. maximum.

4. By way of action, they recommended that the industries and municipalities take definite steps toward correction. They should base the treatment works on the minimum average monthly flow we should expect every 10 years.

That was the challenge issued by the Bi-State Agency and it was supported by the Illinois Sanitary Water Board, the water pollution control agency for Illinois.

With the increasing emphasis on protection of water resources throughout the country and the likelihood that the municipalities and industries in the local area would eventually move to comply with the stated recommendations we now had additional reasons beyond the economic factors for reducing wastes. We therefore intensified our efforts in this direction and entered into a formal program in early 1956. That was the background of our situation 1-1/2 years ago and here is the story of what we have done since then.

Correction of Pollution Problems

Correction of a pollution problem in a plant normally takes two courses. First -- include in the design of any new installation, adequate facilities to dispose of wastes in a manner which will not create new pollution problems. This is a recognized policy of Monsanto and we adhere to it rigidly. In the research work necessary to develop a new product, alternate processes are usually possible and are evaluated. The final choice of process may be strongly influenced by the amount of waste created and the difficulties in disposal of the waste. In the design stage of the project, adequate disposal facilities are provided and the cost of these facilities is considered part of the manufacturing cost of the new product.

The second and often a very difficult and expensive course is to correct pollution caused by existing processes. The first step in solving an existing pollution problem is just like solving most problems -- get the facts. Find out the size, character, and composition of the waste streams. This is necessary for three reasons:

1. To show the size and extent of present pollution problems.

2. To establish a base line by which to measure progress in abatement.

3. To be able to discuss the problem intelligently with control agency officials.

One man should be assigned the job of getting the facts and directing and coordinating waste control efforts. A common practice is to assign this man both the stream and air pollution problems because they are closely related. This was done at Monsanto. The man selected should be a technical man well acquainted with the plant. He will probably need education in waste control practices and terminology. An excellent way to receive this training is by study of books and magazines, attendance at pollution control seminars and conferences and, especially, the two week training program given by the Robert A. Taft Sanitary Engineering Center at Cincinnati, Ohio. This schooling is under the U. S. Public Health Service and is designed mostly for control agency officials. However, industry representatives are welcome and will receive much of the necessary background training in pollution control work. Three men from Monsanto have received this training and all found it very helpful. The course is given once per year and the next session is in March, 1958.

Sampling Wastes

Now we have the man with a minimum amount of training and he is ready to go to work. His first big job will probably be to decide how to sample the wastes. If waste water volume is reasonably constant, 24 hours continuous samplers can be used. If the volume of wastes vary considerably, a proportional-to-flow continuous sampler will be necessary. If peak discharges from batchwise operations are an obvious problem, additional grab samples should be taken as judgement indicates.

Based on our experience, suitable commercial samplers may not be available. Study of our sewer map showed that at the four places we needed to sample, the sewers were deep, none were close to electric power and with damp, corrosive conditions present we weren't sure we wanted electric power. So -- we devised and built a low cost continuous vacuum sampler using a stainless steel oxygen tank out of an airplane (see Figure 1).

Operation of the sampler is as follows:

The tank (1) is evacuated to 20 mm. Hg. (or less) by taking the unit, which is readily portable, to a vacuum source such as a laboratory pump or multi-stage steam ejectors and connecting hose (3) to the source. The evacuated unit is returned to the sampling site and connected to the filter flask (13) which should be suspended in the sewer manhole out of direct sunlight. The polyethylene tube (15) from the sewer runs through the side arm into the flask so that the water flow rate is readily visible and so that siphoning cannot occur. The filter flask is then evacuated by means of the hand pump (10) to the point where water barely starts to drip from the tip of the tubing (15). Too high vacuum can be relieved slowly by the needle valve vent (9) until the desired flow is attained. Valve (6) is closed and the sampling continues by displacement of air through the sight feed bubbler with needle valve (5) into the vacuum tank (1). The needle valve (5) is adjusted to give the flow desired. This adjustment need never be changed unless dirt or water is inadvertently drawn into the valve.

With the unit shown, sample sizes can be controlled from one to three liters in 24 hours. If larger samples are desired, larger vacuum tanks should be used. In order that the sampling rate be reasonably constant over the 24 hour period, the vacuum tank volume should be greater than twice the sample size desired and the filter flask should be protected from extreme temperature changes.

To discourage tampering, the hand vacuum pump can be disconnected daily and a cover locked over the bubbler, valves and gage.

Total materials cost for each unit, including the hand vacuum pump, were about $55.

In our installation, four samplers were installed and a small gasoline engine powered vacuum pump on a station wagon was provided, eliminating the necessity for moving the samplers. The four sampling stations, although nearly a mile apart, can be tended in a total of about 45 minutes per day including taking the samples to the laboratory. This sampler has proved to be quite dependable, is corrosion resistant and is well suited for our use. It has its obvious limitations -- the flask must be protected from extreme temperature changes, the small sampling tube will not handle large solids and the joints must be kept tight.

Of course, the samples have to be analyzed. These analytical procedures are fairly well standardized and, in many cases, are not very accurate but they at least provide some idea of the extent of the problem. Typical analyses which may be needed for chemical plant wastes are: pH and free acidity or alkalinity, suspended solids, Biochemical oxygen demand or chemical oxygen demand -- both rough measures of the oxygen depleting powers of the wastes, percent phenols or other organics, metals which may be present, inorganic salts, etc.

Flow Measurement of Wastes

Flow measurement of waste is the next step unless it was handled concurrently with sampling. Usual methods are to install Parshall flumes or weirs or to measure directly at outfalls if the outfalls are accessible. Flow recorders can be readily used with flumes or weirs. Flows can be calculated roughly in some cases by formulae using size and slope of the sewers and depth of flow.

In our case, obtaining flow data proved to be almost as difficult as obtaining the continuous sampler. Our sewer system was simply not designed for measuring flows. Installation of flumes or weirs was impractical and would have been very expensive because our sewers are deep and the slope is so small that we just could not stand the necessary drop. Levels changed frequently in the sewers when we knew flows had not changed appreciably so we could not tell much from levels.

Working with our laboratory, we developed a method for injecting a Li Cl solution of known strength at a constant rate into the sewers followed by sampling and measuring of its dilution downstream. From the injection rate and the dilution the sewer flow can be calculated quite accurately. Lithium is foreign to our wastes and it has a unique property in that it can be assayed accurately and quickly by flame spectrophotometry in low concentrations of around 1 p.p.m. The Li Cl solution is stored in a drum and is pumped into the sewer to be measured at a constant rate by means of a Sigmamotor pump. This pump operates by a series of fingers which press on a rubber or plastic tube in such a sequence that the liquid is moved forward in the tube. The pumping rate is adjustable by means of a Revco infinitely variable speed reducer. After a few minutes pumping, several grab samples are taken downstream for later assay

for Li Cl concentration so that the dilution and the sewer flow rates can be calculated. We have found that in a fast moving stream, the Li Cl concentration reaches equilibrium very quickly and that only about 10-15 minutes pumping of the solution is necessary. Sodium chloride can be cheaply used for the tracer fluid if chlorides are foreign or at a constant level in the waste stream. Radioactive tracers can be used in some cases but this is no job for an amateur.

Waste Reduction Program

Let's assume that we now have the facts and a pretty good idea of the problems facing us. The next step is a waste reduction program. Most industrial plants are reasonably efficient (and, indeed, they have to be in this day of stiff competition). They don't waste materials needlessly because they can't do that and stay in business. However, no process and no operation is perfect and often very substantial reduction in wastes can be made through an organized program.

A waste reduction program has certain needs which must be met before it can be successful -- first, an attitude of management of wanting and being willing to pay for waste reduction. A good waste control program can usually be made to pay overall but frequently the cost of recovery of a pollutant is far greater than its value. Most top management personnel are well informed and realize the need for waste reduction. If they are kept well informed through regular progress reports, they will usually continue to support the program. The support of first line and middle management can be obtained by good communications -- keep them well informed and let them know of the progress and benefits. At the Monsanto Krummrich Plant we have talked to operating and maintenance supervision about pollution problems and waste reduction programs in their regular staff meetings and have been rewarded with real support for our work.

The second need is the cooperation and help of every operator and maintenance man. Much waste reduction can often be accomplished through ordinary good housekeeping. Here again, good communications pay -- advertise the accomplishments and talk to the men about the program. Many of them are fishermen or own boats and they have a real interest in stream purity. They will appreciate the work being done and will cooperate. We have not yet spoken to the operator and maintenance worker groups in formal meetings but we plan to in the near future. We have printed two articles in our plant newspaper describing the problems and the program.

The third need is to analyze each step in each operation to determine with reasonable accuracy the loss at each step. Besides making balances on the main materials, sample and analyze the waste streams and measure the waste flows. With the application of chemical engineering principles, processes and equipment can be altered to reduce the waste down to a practical minimum.

Let's look at several of the waste reduction projects on which we are working or which have been recently developed to show typical ways to reduce waste.

In one department which flakes a quite objectionable organic material, the dust from the flakers is being drowned to the sewer by means of water jets. The product is insoluble in water and it was thought that the amount of material sewered was insignificant. We constructed a sampler designed to sample streams containing fair amounts of settleable solids.

With analysis of the samples obtained and direct measurement of the flow at the outfall we found that the amount of material lost is much higher than expected and represents a real contribution to the pollution problem. Because the amount is large it is also attractive financially to recover the product and we are now working on means to do just that. We will probably capture the dust in a caustic solution and return the solution to the process.

In the same department another fine dust from ventilating ducts was being drowned and sewered in a Schneible tower. A Schneible tower is a type of wet gas washer. Also, a bag filter installation was being used to collect dust from another part of the same process The bag filter was not operating properly, creating an air pollution problem and high maintenance costs. We decided to replace the bag filter with a new Schneible tower. We included in the design of the new tower facilities to completely recirculate the water used for washing and to return this water to process where the dissolved material could be recovered. We made arrangements at the same time to use this same water for circulating over the original Schneible tower and thereby recovered the material we had been sewering. We therefore in this one project solved a stream pollution problem, an air pollution problem, decreased maintenance costs and are recovering substantial amounts of valuable material.

Again, in this same production department, hydrochloric acid gas is a by-product of the reaction. This gas is recovered for sale as hydrochloric acid. The first step in purification of this gas involves scrubbing it with strong sulfuric acid to remove the bulk of the organic material in the acid gas. This sulfuric acid is periodically sewered when it becomes no longer effective. Now the sulfuric acid itself doesn't contribute much to stream pollution as the Mississippi River is normally alkaline but the organics contained in the acid are objectionable. We arranged with our Research Department to test this spent acid for possible fertilizer manufacture. They found that despite its poor color and objectionable smell, the acid made perfectly good fertilizer. We are now making arrangements for sale of this acid at a reduced price which will barely cover the cost of handling but we will have overcome another stream pollution problem.

Another example - in another department where an organic intermediate is reacted with chlorine on a batchwise basis. HCl gas is given off as a by-product and had been sewered. The gas as evolved from the chlorinator was quite hot and carried along with it substantial amounts of the organic material in vapor form. We installed a gas scrubber containing cold raw material for the following chlorinator batch. This cold raw material absorbs the organic vapors from the gas stream and the HCl now leaves the scrubber with negligible organic content.

Another job we are presently working on also involves a combined air and stream pollution problem. An oily sludge residue from a reaction is presently sewered in quite small amounts. It reacts slowly with water in the sewer and makes a most objectionable smell. We are working in the laboratory to react the waste with live steam and recover the volatile materials which have some value. The steam stripped oil sludge will lose its objectionable smell and the oil layer can be easily collected for burning.

In yet another department, formation of useless by-products was quite large. The Research Department worked extensively on the process and found that the manner in which the ingredients were added to the main reactor strongly influenced the formation of by-products. Optimum conditions were determined and the equipment was revised to fit the new process. The loss of by-products was sharply reduced, the pollution problem was minimized and the project is paying handsome returns.

These six examples given are typical of the projects either finished, underway or planned for the waste reduction program. In each case the approach is about the same:

1st - Sample, analyze and measure to get the facts on extent of the problem.

2nd - Develop a project to abate the problem in the most economical manner. This can involve process changes, sale of substandard material at reduced price, improved collection equipment, reuse of waste materials, improved cooling of gas streams, incineration or many other means.

3rd - Assist the operating department in taking full advantage of the change.

At our Krummrich Plant we are frankly proud of the job we are doing on waste reduction. In the last 18 months we have completed 20 waste reduction projects costing almost $200,000. These projects have resulted in very significant decreases in our waste discharge of both organic and inorganic materials. The discharge of phenolic materials, for example, has been reduced by 1/3 in the past six months. Not all the projects are self supporting but these completed projects will pay their way financially when considered as a group. This is normal at the start of a waste reduction program -- naturally, we first worked

on the problems involving the largest amounts of wastes and, of course, these larger wastes offer the best prospects for financial return. We have been skimming the cream of the crop of waste problems.

In construction and in active design stage we have 12 projects which will cost another $200,000. These projects offer less returns on both pollution abatement and money bases than the 20 completed projects. Future planned projects will be even more expensive and will offer continually decreasing return.

Under needs of a waste reduction program, we have discussed the need of management support, support of the worker personnel and the need to analyze and develop projects for improvement. The fourth and possibly the greatest need is to fix responsibility in the operating group for waste reduction. The pollution control engineer can lead and point the way, he can measure and analyze and he can develop projects for the equipment and process changes but the operating group eventually has to do the job. Pollution control is everybody's business.

In one large department we are assisting operating supervision of the department by monitoring their sewered wastes. We have five small samplers in operation at this particular department in order to pin point any losses to definite areas. These samplers consist of Roll Flex pumps which are plastic tube pumps. A nylon roller in a planetary motion presses against the tube inside the pump and thus forces liquid through the tube. The pump is driven by a Revco speed reducer which is in turn driven by a small, inexpensive totally enclosed shaded pole motor. The sampling rate can be adjusted down to as little as 1/2 gallon per day. This makes an excellent sampling pump for plant use. The assembly includes a clock timer which moves the discharge tube slowly around a trough divided into nine spaces. From each space a tube leads to a sample jar receiver. The clock makes only one revolution per week and each one of the divisions in the trough represents one eight hour shift of sampling. With the nine sample jar receivers we can set the timer on Friday morning and on Monday morning pick up the nine week end shift samples. Because there are five samplers in use and the three samples per day would make fifteen samples to be analyzed, we composite the three shift samples at each station daily. If the assay of the composite sample is high, the individual samples are run to determine on exactly which shift and in which area the loss occurred.

We show the results of the sampling graphically in the department supervisor's office on a large chart so that trends can be readily noticed and corrective action can be promptly taken.

We plan to use about the same techniques in other parts of the plant in order to help supervision maintain the tight control that is needed if wastes are to be held to an absolute minimum.

Treatment vs. Waste Reduction -

After the wastes have been reduced to an economical minimum -- then's the time to consider building a waste treatment plant. Very frequently, if the receiving stream is large and the waste reduction has been successful, there will be no need for a treatment plant. A stream in good condition has marvelous self purification powers and can assimilate large amounts of some pollutants with little harm. Waste treatment plants are very expensive to build and expensive to operate. They should generally be built only if waste reduction efforts won't do the job.

We don't have time to discuss treatment of chemical wastes -- that's a big subject and extensive research work is going on around the country to find cheaper and more effective ways to treat. There are often several ways to render a specific waste harmless. Let's take phenol for example - it can be oxidized destructively by excess treatment with chlorine, chlorine dioxide or ozone, or by bacteria using lagoons, biofilters or activated sludge treatments - a new development along this line is use of cooling towers for the bacterial oxidation. The phenol can be burned in incinerators or low temperature catalytic combustion furnaces. There are many ways but so far they are all very costly -- destruction of the phenol usually costs several times what it is worth as a pure material.

I hope that in this report I have given you some idea of the problems and the approaches used to solve those problems by a typical chemical plant in its efforts to help preserve our water resources. The chemical industries are aware of their responsibilities and are progressing at a rapid rate. We must realize that a vast expenditure of effort and money and a lot of time will be necessary to do this job.

P. Hodges

P. B. Hodges

emz

Exhibit 65

MONSANTO CHEMICAL COMPANY

ST. LOUIS 4, MISSOURI

1700 South Second Street

RECEIVED

November 13, 1957

Illinois State Sanitary Water Board
Springfield,
Illinois

Gentlemen:

We are considering establishing a dump for our solid waste materials at Monsanto, Illinois.

Our present thought is to use some ground located approximately 200 feet from the east bank of the Mississippi River.

Do you have any regulations which we should be familiar with in locating and operating this type of dump.

Yours very truly,

C N Stutz (per R L)

C. N. Stutz
Sanitary Engineer
Organic Division

CNS:rw

December 27, 1957

MONSANTO - Monsanto Chemical Company
Industrial Waste Dump Proposal

Mr. C. M. Stutz
Sanitary Engineer, Organic Division
Monsanto Chemical Company
1700 South Second Street
St. Louis 4, Missouri

Dear Mr. Stutz:

I am sorry this reply to your November 13th letter has been delayed so long.

We have no special regulations applying to dumps. Our only concern is that the dump be located and operated to prevent any pollutional material from causing stream pollution. Fluid wastes must be retained in the dump area and runoff from the area in wet weather must not create a pollution problem. This you already know.

When you have some specific information regarding the type of material to be disposed of and the topography of the area, we shall be glad to review your plan in detail if you wish to have us do so.

Very truly yours,

M. R. Golly
Sanitary Engineer

M Gmh
cc - WCR

Exhibit 66

MINUTES OF CONFERENCE WITH
ILLINOIS SANITARY WATER BOARD

Place - Illinois State Capital, Springfield, Illinois

Date - August 4, 1958 at 1:00 PM

Present - For Illinois Sanitary Water Board

Clarence Klassen, Executive Secretary
Carl Gross, Sanitary Engineer

For Monsanto Chemical Co. W.G. Krummrich Plant, Monsanto, Ill.

C.N. Stutz
J.T. Garrett
P.B. Hodges

Mr. Stutz opened the meeting by referring to the engineering survey being made in the East St. Louis area by Horner and Schifrin. He explained that we would soon have to decide on how to proceed with our future work in pollution abatement - whether we would handle our wastes separately, collaborate with the East Side Levee and Sanitary District or with the Village of Monsanto, etc. We needed to know more of what was expected of us before proceeding with any plans. Particularly, the river limits for phenol concentration as stated in the Bi-State Development Report were very restrictive and would be difficult to obtain.

Messrs. Klassen and Gross stated that they want to be practical about the requirements and to not set up any requirements that we cannot reasonably meet. They consider waste disposal a justifiable river use and stated that they follow the "point of use" doctrine - that the river should be in suitable condition at the point where it is to be used. They pointed out that we are fortunate in our location - that the nearest point downstream where the Mississippi was now used as a source of domestic water supply was Chester, Illinois - about 70 river miles.

We told them of our in-plant waste reduction program that is now underway. We realized that we were a heavy contributor of phenolics. Our in-plant reduction program to date has reduced the phenolic wastes leaving our plant from about 10,000 lbs. per day in 1956 to 7,000 lbs. per day at present. With present plans, we expect to reduce this amount to 5,000 lbs. per day by the end of this year and to 2,500 - 3,000 lbs. per day by 1961. We will continue this waste reduction program so as to eventually reduce the phenolics leaving the plant to approximately 1,000 lbs. per day.

We asked if this in-plant reduction program along with primary treatment would be satisfactory to the Illinois Sanitary Board. Messrs. Klassen and Gross stated that they thought this would be an acceptable program, but pointed out that it would depend on the downstream use of the river and upon complaints that might be received.

The subjects of acid wastes and odor producing substances were discussed. Messrs. Klassen and Gross indicated that these would fall into the same category as phenolic wastes and would require treatment only if they were damaging to the uses of the river. Such damage would be gaged by complaints received or apparent damage.

The meeting adjourned with the understanding that we would proceed with our in-plant reduction program as indicated above along with primary treatment of our wastes.

P. Hodges

Paul B. Hodges

mb

Exhibit 67

Monsanto
COMPANY

Sauget, Illinois 62201
(618) 271-5835

August 16, 1968

RECEIVED
AUG 21 1968
ILLINOIS DEPT. OF PUBLIC HEALTH

Mr. C. W. Klassen
Technical Secretary
State of Illinois Sanitary Water Board
Springfield, Illinois 62706

Dear Mr. Klassen:

In reply to your letter of August 7, 1968, I have the following information which you need to set up a monitoring program for our industrial waste disposal site.

In general we deposit at this site those wastes which would add to the sludge load at the waste treatment plant or would dissolve in our wastewater and add to the phenol content, C.O.D. or color of the final effluent. Chemically, they fall into 6 main groups:

1. Phenols
2. Aromatic Nitro Compounds
3. Aromatic Amines and Nitro Amines (highly colored)
4. Chlorinated aromatic hydrocarbons
5. Aromatic and aliphatic Carboxylic acids
6. Condensation or reaction products of the above

A more detailed list of sources and quantities follows:

1. Still Residues - tars, condensation and decomposition products of doubtful composition but with some of the primary product remaining.

From the Distillation of:	Approx. Annual Amount
a. Phenol	1,020 Cu. yds.
b. Chlorophenol	720 Cu. yds.
c. Nitro-Aniline and similar compounds	1,700 Cu. yds.
d. Chlorobenzol (Tri-Tetrachlor)	130 Cu. yds.
e. Chloro aniline	1,100 Cu. yds.
f. Other aniline derivatives	200 Cu. yds.
g. Nitro benzene derivatives	100 Cu. yds.
h. Aromatic carboxylic acids (Maleic, Phthalic, etc.)	1,500 Cu. yds.
i. Chlorophenol Ether	350 Cu. yds.

2. By-Products -

a.	Mixed isomers of nitrochlorobenzene	1,700 Cu. yds
	" " " Dichlorophenol	3,000 Cu. yds
b.	Waste Maleic Anhydride	730 Cu. yds
c.	Waste Chlorobenzenes and Nitro-chlorobenzenes	120 Cu. yds

3. Contaminated Water and Acids -

a.	Water with varying amounts of phenols (0-15%)	7,200 Cu. yds
b.	Waste Sulfuric acid with chlorophenol present	1,500 Cu. yds
c.	Caustic Soda Solution with chlorophenol present	5,300 Cu. yds

4. Waste Solvents -

a.	Waste Methanol contaminated with Mercaptans	600 Cu. yds
b.	Waste Isopropanol - Water and chlorinated hydrocarbon	5,500 Cu. yds
c.	Research Waste: Miscellaneous Solvents and Materials	1,019 Cu. yds
d.	Oily Materials from Oil Additive Production	101 Cu. yds

5. Filter Sludge -

a.	Attapulgus Earth -Keisulguhr from Alkyl Benzene filtration	600 Cu. yds
b.	Lime Mud from nitro-aniline production.	1,000 Cu. yds

6. Unwanted Samples and Waste resulting from taking samples -

a.	Chlorophenols	72 Cu. yds
b.	Laboratory Samples (Everything)	208 Cu. yds

7. Miscellaneous Wastes -

These consist of spoiled material, floor sweepings, sludge from cleaning equipment and storage tanks etc which would cause problems if sewered. They are mostly reaction products of the above materials eg Esters of phenols or aliphatic alcohols with carboxylic acids such as phthallic, Maleic, or Benzoic acid, Anilides, Sulphonated phenols or other aromatics.

The relative quantities of these materials will necessarily vary according to sales of particular products and there will be additions to and deletions from this list. However, the general chemical classification will remain much the same.

Please let me know if you need any additional information.

Very truly yours,

J. R. McClain

J. R. McClain
Plant Manager

jo

Exhibit 68

(DO NOT USE)

32018

FORM A: GENERAL FACILITY INFORMATION

Company Name: Monsanto Company

Facility Name: W. G. Krummrich

Address: Route 3
No. Street

Sauget IL 62201
City State Zip Code

Name

Posit.

Phone

1. Year Facility Opened 19 1 8 (10-11)

2. Primary SIC Code 2 8 6 9 (12-15)

3. Estimate the total amounts of process wastes (excluding wastes sold for use) generated by this facility during 1978:

..... (16-24)

tons 1 4 0 (25-32)

..... (33-41)

4. Estimate (in whole percents) how these process wastes generated in 1978 were disposed of:

in landfill 6 9 (42-44)

in pit/pond/lagoon 0 (45-47)

in deep well 0 (48-50)

incinerated 3 1 (51-53)

reprocessed/recycled 0 (54-56)

evaporated 0 (57-59)

unknown 0 (60-62)

other (Specify _____) ..... (63-65)

5. What is the total number of known sites (including disposal on the property where this facility is located as one site) that have been used for the disposal of process wastes from this facility since 1950? 1 0 (66-68)

COMPLETE ONE FORM "B" FOR EACH OF THE SITES

6. Have any of the process wastes generated at this facility been hauled (removed) from this facility for disposal? (Yes=1; no=2) 1 (69)

IF YES, COMPLETE FORM "C"

7. Do you know the disposal site locations of all of the process waste hauled from your facility since 1950? (Yes=1; no=2) 1 (70)

IF NO, COMPLETE ONE FORM "D" FOR EACH FIRM OR CONTRACTOR WHO TOOK WASTE TO AN UNKNOWN LOCATION

8. Specify the earliest year represented by information from company or facility records supplied on this and other forms 19 7 2 (71-7

9. Specify the earliest year represented by information from employee knowledge supplied on this and other forms 19 5 0 (73-7

NOTICE: If the film image is less clear than this notice, it is due to the

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

32012001

Company Name: Monsanto
Facility Name: W. G. Krummrich
Name of Site: NECO
Address of Site: P.O. Box 158
no. street

Sheffield IL 63161
city state zip code

Name of Owner (while used by facility): Nuclear Eng.
Address: 9200 Shelbyville Route Suite 526
no. street

Louisville Kentucky 40207
city state zip code

Current Owner (if different from above): (Same)
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [2] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [2] (12)
   IF CLOSED, specify year closed ..... 19[ ] (13-14)
4. Year first used for process waste from this facility ..... 19[76] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[79] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ] (19-26)
   hundred tons ..... [ ] (27-33)
   thousand cubic yards ..... [ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [1] (42)
   landfill, mixed industrial waste ..... [1] (43)
   landfill, drummed waste ..... [1] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [3] (49)
   treatment (eg. neutralizing)..... [3] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [ ] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [3] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

FORM B CONTINUED ON SECOND PAGE

[1] (80)

Facility Name: W. G. Krummrich

Site Name: Sheffield/BECO

32 018 001

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2-not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	1	(1
pickling liquor	2	(1
metal plating waste	2	(1
circuit etchings	2	(1
inorganic acid manufacture	1	(1
organic acid manufacture	2	(1
Base solutions, with pH>10	1	(1
caustic soda manufacture	2	(1
nylon and similar polymer generation	2	(1
scrubber residual	2	(1
Heavy metals & trace metals (bonded organically & inorganically)	1	(2
arsenic, selenium, antimony	2	(2
mercury	1	(2
iron, manganese, magnesium	1	(2
zinc, cadmium, copper, chromium (trivalent)	9	(2
chromium (hexavalent)	9	(2
lead	9	(2
Radioactive residues, >50 pico curies/gram	2	(2
uranium residuals & residuals for UF_6 recycling	2	(2
lathanide series elements and rare earth salts	2	(2
phosphate slag	2	(2
thorium	2	(2
radium	2	(2
other alpha, beta & gamma emitters	2	(2
Organics	1	(2
insecticides & intermediates	1	(2
herbicides & intermediates	1	(2
fungicides & intermediates	2	(2
rodenticides & intermediates	2	(2
halogenated aliphatics	1	(
halogenated aromatics	1	(
acrylates & latex emulsions	2	(
PCB/PBB's	2	(
amides, amines, imides	1	(
plastizers	1	(
resins	2	(
elastomers	2	(
solvents polar (except water)	1	(
carbontetrachloride	2	(
trichloroethylene	2	(
other solvents nonpolar	1	(
solvents halogenated aliphatic	1	(
solvents halogenated aromatic	1	(
oils and oil sludges	2	(
esters and ethers	2	(
alcohols	2	(
ketones & aldehydes	2	(
dioxins	9	(
Inorganics	1	(
salts	1	(
mercaptans	2	(
Misc	1	
pharmaceutical wastes	2	
paints & pigments	2	
catalysts (eg. vanadium, platinum, palladium)	1	
asbestos	2	
shock sensitive wastes (eg. nitrated toluenes)	2	
air water reactive wastes (eg. P_4, aluminum chloride)	1	
wastes with flash point below 100° F	1	

Facility Name: W. G. Krummrich

32018 003

Site Name: Rollins Environmental

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2 not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>10	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	2	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	1	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	2	(42)
amides, amines, imides	1	(43)
plastizers	1	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	2	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	1	(54)
alcohols	1	(55)
ketones & aldehydes	2	(56)
dioxins	9	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc.	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	2	(67)
wastes with flash point below 100° F	1	(68)

Company Name: Monsanto

Facility Name: W. G. Krummrich

Site Name: Earthline

37013004

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2-not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>10	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	1	(20)
arsenic, selenium, antimony	9	(21)
mercury	1	(22)
iron, manganese, magnesium	9	(23)
zinc, cadmium, copper, chromium (trivalent)	9	(24)
chromium (hexavalent)	9	(25)
lead	9	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	1	(35)
herbicides & intermediates	1	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	1	(43)
plastizers	1	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	1	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	1	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	1	(54)
alcohols	1	(55)
ketones & aldehydes	1	(56)
dioxins	9	(57)
Inorganics	1	(58)
salts	1	(59)
mercaptans	2	(60)
Misc.	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	9	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	1	(67)
wastes with flash point below 100° F	1	(68)

Facility Name: W.G. Krummrich

32-018 005

Site Name: Hyon Waste Mangement

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2-not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>10	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	2	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	1	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	1	(43)
plastizers	1	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	1	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	1	(50)
solvents halogenated aliphatic	1	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	1	(54)
alcohols	1	(55)
ketones & aldehydes	2	(56)
dioxins	9	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc.	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	2	(67)
wastes with flash point below 100° F	1	(68)

2 (80)

Facility Name: M.G. Kramarich

32018 006

Site Name: Teco

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2-not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	1	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	1	(14)
organic acid manufacture	1	(15)
Base solutions, with pH>10	1	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	2	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	1	(35)
herbicides & intermediates	1	(36)
fungicides & intermediates	1	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	1	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	1	(43)
plastizers	1	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	1	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	1	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	2	(54)
alcohols	1	(55)
ketones & aldehydes	2	(56)
dioxins	9	(57)
Inorganics	1	(58)
salts	2	(59)
mercaptans	2	(60)
Misc	1	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	1	(67)
wastes with flash point below 100° F	1	(68)

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

3 2 018 007

Company Name: Monsanto
Facility Name: W.G. Krummrich
Name of Site: W.G. Krummrich - Incinerator
Address of Site: Route 3
no. street

Sauget, IL 62201
city state zip code

Name of Owner (while used by facility): Monsanto
Address: 800 N. Lindbergh
no. street

St. Louis MO
city state zip code

Current Owner (if different from above):
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site) ..... [1] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [1] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[7][7] (13-14)
4. Year first used for process waste from this facility ..... 19[7][1] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7][7] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ][ ][ ][ ][ ][ ] (19-26)
   hundred tons ..... [ ][ ][ ][ ][1][5][1] (27-33)
   thousand cubic yards ..... [ ][ ][ ][ ][ ][ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [3] (42)
   landfill, mixed industrial waste ..... [3] (43)
   landfill, drummed waste ..... [3] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [2] (49)
   treatment (eg. neutralizing) ..... [3] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [3] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [9] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

FORM IF CONTINUED ON SECOND PAGE

Company Name: [illegible]

Facility Name: W.G. Krummrich

Site Name: W.G. Krummrich

32018007

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>10	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	2	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	1	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	2	(43)
plastizers	1	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	1	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	1	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	2	(54)
alcohols	2	(55)
ketones & aldehydes	1	(56)
dioxins	9	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	2	(67)
wastes with flash point below 100° F	2	(68)

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

3.2.018 008

Company Name: Monsanto
Facility Name: W.G. Krummrich
Name of Site: Monsanto Landfill
Address of Site: Route 3
no. street

Sauget, IL 62201
city state zip code

Name of Owner (while used by facility): Monsanto
Address: 800 N. Lindbergh
no. street

St. Louis MO 63141
city state zip code

Current Owner (if different from above):
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... [1] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [1] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[7][8] (13-14)
4. Year first used for process waste from this facility ..... 19[5][7] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7][8] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ][ ][ ][ ][ ][ ][ ] (19-26)
   hundred tons ..... [ ][ ][ ][2][6][2][5] (27-33)
   thousand cubic yards ..... [ ][ ][ ][ ][ ][ ][ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [2] (42)
   landfill, mixed industrial waste ..... [2] (43)
   landfill, drummed waste ..... [2] (44)
   landfill, municipal refuse co-disposed ... [2] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [3] (49)
   treatment (eg. neutralizing)..... [2] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [ ] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [2] (53) 2

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

FORM B CONTINUED ON SECOND PAGE

Company Name: Monsanto

Facility Name: W. G. Krummrich

32018 008

Site Name: Monsanto Landfill

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2 not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	1	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	1	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>10	1	(16)
caustic soda manufacture	1	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	2	(20)
arsenic, selenium, antimony	2	(21)
mercury	1	(22)
iron, manganese, magnesium	1	(23)
zinc, cadmium, copper, chromium (trivalent)	9	(24)
chromium (hexavalent)	9	(25)
lead	9	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	1	(35)
herbicides & intermediates	1	(36)
fungicides & intermediates	1	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	1	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	1	(43)
plastizers	1	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	1	(47)
carbontetrachloride	1	(48)
trichloroethylene	1	(49)
other solvents nonpolar	1	(50)
solvents halogenated aliphatic	1	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	1	(54)
alcohols	1	(55)
ketones & aldehydes	1	(56)
dioxins	9	(57)
Inorganics	1	(58)
salts	1	(59)
mercaptans	2	(60)
Misc.	1	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	1	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	1	(67)
wastes with flash point below 100° F	1	(68)

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

32018 009

Company Name: Monsanto
Facility Name: W.G. Krummrich
Name of Site: W.G. Krummrich
Address of Site: Route 3
no. street

Sauget, IL 62201
city state zip code

Name of Owner (while used by facility): Monsanto
Address: 800 N. Lindbergh
no. street

St. Louis MO 63201
city state zip code

Current Owner (if different from above):
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... [1] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [1] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[5 7] (13-14)
4. Year first used for process waste from this facility ..... 19[ ] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[5 7] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ] (19-26)
   * hundred tons ..... [ ] (27-33)
   thousand cubic yards ..... [ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [2] (42)
   landfill, mixed industrial waste ..... [2] (43)
   landfill, drummed waste ..... [2] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [3] (49)
   treatment (eg. neutralizing)..... [3] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [ ] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [1] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

* No records or information available to determine or estimate

FORM IS CONTINUED ON SECOND PAGE

[1] (80)

Facility Name: W. G. Krummrich

Site Name: W. G. Krummrich

32018009

9. Components (or characteristics) of process waste from this facility disposed at site: (1 present in waste; 2 not present in waste; 9 don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	1	(10)
pickling liquor	9	(11)
metal plating waste	9	(12)
circuit etchings	9	(13)
inorganic acid manufacture	1	(14)
organic acid manufacture	9	(15)
Base solutions, with pH>10	9	(16)
caustic soda manufacture	9	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	9	(19)
Heavy metals & trace metals (bonded organically & inorganically)	1	(20)
arsenic, selenium, antimony	2	(21)
mercury	1	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	1	(35)
herbicides & intermediates	9	(36)
fungicides & intermediates	9	(37)
rodenticides & intermediates	9	(38)
halogenated aliphatics	1	(39)
halogenated aromatics	9	(40)
acrylates & latex emulsions	9	(41)
PCB/PBB's	9	(42)
amides, amines, imides	9	(43)
plastizers	9	(44)
resins	9	(45)
elastomers	9	(46)
solvents polar (except water)	9	(47)
carbontetrachloride	9	(48)
trichloroethylene	9	(49)
other solvents nonpolar	9	(50)
solvents halogenated aliphatic	1	(51)
solvents halogenated aromatic	9	(52)
oils and oil sludges	9	(53)
esters and ethers	9	(54)
alcohols	9	(55)
ketones & aldehydes	9	(56)
dioxins	9	(57)
Inorganics	9	(58)
salts	9	(59)
mercaptans	9	(60)
Misc.	9	(61)
pharmaceutical wastes	9	(62)
paints & pigments	9	(63)
catalysts (eg. vanadium, platinum, palladium)	9	(64)
asbestos	9	(65)
shock sensitive wastes (eg. nitrated toluenes)	9	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	1	(67)
wastes with flash point below 100° F	9	(68)

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

32018 010

Company Name: Monsanto
Facility Name: W. G. Krummrich Plant
Name of Site: Monsanto Illinois Landfill
Address of Site: Falling Springs Road
no. street

Sauget IL 62201
city state zip code

Name of Owner (while used by facility): Unknown
Address:
no. street

city state zip code

Current Owner (if different from above):
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [3] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[5][7] (13-14)
* 4. Year first used for process waste from this facility ..... 19[-][-] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[5][7] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ][ ][ ][ ][ ][ ][ ] (19-26)
   * * hundred tons ..... [ ][ ][ ][ ][ ][ ][ ] (27-33)
   thousand cubic yards ..... [ ][ ][ ][ ][ ][ ][ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [2] (42)
   landfill, mixed industrial waste ..... [2] (43)
   landfill, drummed waste ..... [3] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [3] (49)
   treatment (eg. neutralizing)..... [3] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [ ] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [9] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

* Don't Know

* * No records or information available to determine or estimate

FORM IF CONTINUED ON SECOND PAGE

[1] (80)

Company Name: Monsanto

Facility Name: W. G. Krummrich

32018 010

Site Name: Monsanto Illinois Landfill

9. Components (or characteristics) of process waste from this facility disposed at site: (1-present in waste; 2-not present in waste; 9-don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	9	(10)
pickling liquor	9	(11)
metal plating waste	9	(12)
circuit etchings	9	(13)
inorganic acid manufacture	9	(14)
organic acid manufacture	9	(15)
Base solutions, with pH>10	9	(16)
caustic soda manufacture	9	(17)
nylon and similar polymer generation	9	(18)
scrubber residual	9	(19)
Heavy metals & trace metals (bonded organically & inorganically)	9	(20)
arsenic, selenium, antimony	9	(21)
mercury	9	(22)
iron, manganese, magnesium	9	(23)
zinc, cadmium, copper, chromium (trivalent)	9	(24)
chromium (hexavalent)	9	(25)
lead	2	(26)
Radioactive residues, >3 pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	9	(35)
herbicides & intermediates	9	(36)
fungicides & intermediates	9	(37)
rodenticides & intermediates	9	(38)
halogenated aliphatics	9	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	9	(41)
PCB/PBB's	9	(42)
amides, amines, imides	9	(43)
plastizers	9	(44)
resins	9	(45)
elastomers	9	(46)
solvents polar (except water)	9	(47)
carbontetrachloride	9	(48)
trichloroethylene	9	(49)
other solvents nonpolar	9	(50)
solvents halogenated aliphatic	9	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	9	(53)
esters and ethers	9	(54)
alcohols	9	(55)
ketones & aldehydes	9	(56)
dioxins	9	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc.	9	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	9	(64)
asbestos	9	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	2	(67)
wastes with flash point below 100° F	9	(68)

[illegible] IMPLIER INFORMATION (DO NOT USE)

32018

PROVIDE A COMPLETE LIST OF ALL FIRMS AND INDEPENDENT CONTRACTORS, INCLUDING THE COMPANY AND ITS AFFILIATES AND SUBSIDIARIES, USED TO REMOVE PROCESS WASTES FROM THIS FACILITY SINCE 1950.

Company Name: Monsanto

Facility Name: W. G. Krummrich

Name of Firm or Contractor	Address	ICC # (If Known)	Years Used
Matlack	One Collins Plaza, Wilmington, Del		1977-1979
Sta. Transportation	P.O. Box 1331, St. Louis, MO		1979
United Disposal	1838 N. Broadway, St. Louis, MO		1977-1978
RECO	P.O. Box 158, Sheffield, IL		1976-1979
Monsanto	W. G. Krummrich		1950-1973

FORM B: DISPOSAL SITE INFORMATION

[2 7 1 1 1 6 0 9 1] (1-8)
(DO NOT USE)

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: Koppers Company, Inc. Division/Subsidiary Forest Products Group
Facility Name: Wood Treating Chemicals
Name of Site: WT Krummrich Plant
Address of Site: _____
no. street

Sauget Illinois
city state zip code

Name of Owner (while used by facility): Montsanto
Address: Same as above
no. street

_____
city state zip code

Current Owner (if different from above): Same as above
Address: _____
no. street

_____
city state zip code

1. Location (1= the property on which facility is located; 2= off-site) ..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership 9=don't know) ..... [2] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[7 4] (13-14)
4. Year first used for process waste from this facility ..... 19[6 7] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7 4] (17-18)
6. Total amount of process waste from this facility disposed at site:
   USE TONS ONLY IF POSSIBLE: thousand gallons ..... [ ] (19-26)
   Right justify response hundred tons ..... [2] (27-33)
   thousand cubic yards ..... [ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   - landfill, mono industrial waste ..... [3] (42)
   - landfill, mixed industrial waste ..... [2] (43)
   - landfill, drummed waste ..... [2] (44)
   - landfill, municipal refuse co-disposed ... [3] (45)
   - pits/ponds/lagoons ..... [2] (46)
   - deep well injection ..... [3] (47)
   - land farming ..... [3] (48)
   - incineration ..... [3] (49)
   - treatment (eg. neutralizing) ..... [3] (50)
   - reprocessing/recycling ..... [3] (51)
   - other (specify) _____ .... [3] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [3] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

Montsanto - same address as above

FORM B CONTINUED ON SECOND PAGE

[1] (80)

|_|_|_|_|_|_|_| (1-8)
(DO NOT USE)

23009 006

FORM B: DISPOSAL SITE INFORMATION

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: General Electric Co. Division/Subsidiary: Laminated & Insulating Materials Business Dept.
Facility Name: [illegible]
Name of Site: Monsanto Chemical Company
Address of Site: Department 206
no. street

Sauget, Illinois 62201
city state zip code

Name of Owner (while used by facility): Monsanto Chemical
Address:
no. street

city state zip code

Current Owner (if different from above):
Address:
no. street

city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... |2| (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... |2| (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... |2| (12)
   IF CLOSED, specify year closed ..... 19|9| (13-14)
4. Year first used for process waste from this facility ..... 19|7|3| (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19|7|3| (17-18)
6. Total amount of process waste from this facility disposed at site:
   USE TONS ONLY IF POSSIBLE: thousand gallons ..... |_|_|_|_|_|_|_|_| (19-26)
   Right justify response hundred tons ..... |9|9|9|9|9|9|9|9| (27-33)
   thousand cubic yards ..... |_|_|_|_|_|_|_|_| (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)

landfill, mono industrial waste	9	(42)
landfill, mixed industrial waste	9	(43)
landfill, drummed waste	9	(44)
landfill, municipal refuse co-disposed ...	9	(45)
pits/ponds/lagoons	9	(46)
deep well injection	9	(47)
land farming	9	(48)
incineration	1	(49)
treatment (eg. neutralizing).....	9	(50)
reprocessing/recycling	9	(51)
other (specify)	9	(52)

8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... |9| (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

* NOTE: One load of empty drums and chemical mixes containing PCB's returned to Monsanto for disposal.

FORM B CONTINUED ON SECOND PAGE

FINAL

3 1 0 0 3 0 9 5 (1-8)
(DO NOT USE)

FORM B: DISPOSAL SITE INFORMATION

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: National Distillers & Chemical Corp. Division/Subsidiary U.S. Industrial Chemicals Co.
Facility Name: Houston Plant
Name of Site: Monsanto Industrial Chemicals Co.
Address of Site: _____
no. street

Sauget Illinois 62201
city state zip code

Name of Owner (while used by facility): Monsanto Industrial Chemicals Co.
Address: 800 North Lindbergh Boulevard
no. street

St. Louis Missouri 63166
city state zip code

Current Owner (if different from above): _____
Address: _____
no. street

_____
city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... 2 (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership 9=don't know) 2 (11)
3. Current status (1= closed; 2= still in use; 9=don't know) 9 (12)
   IF CLOSED, specify year closed ..... 19 __ (13-14)
4. Year first used for process waste from this facility 19 7 3 (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) 19 7 3 (17-18)
6. Total amount of process waste from this facility disposed at site:
   USE TONS ONLY IF POSSIBLE: thousand gallons ...20 gallons 0 2 (19-26)
   Right justify response hundred tons ..... (27-33)
   thousand cubic yards ..... (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)

   We have information that the material was incinerated, but we are not aware of the current status of the facility.

   landfill, mono industrial waste 3 (42)
   landfill, mixed industrial waste 3 (43)
   landfill, drummed waste 3 (44)
   landfill, municipal refuse co-disposed ... 3 (45)
   pits/ponds/lagoons 3 (46)
   deep well injection 3 (47)
   land farming 3 (48)
   incineration 9 (49)
   treatment (eg. neutralizing)..... 3 (50)
   reprocessing/recycling 3 (51)
   other (specify) _____.... 3 (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) 3 (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

FORM B CONTINUED ON SECOND PAGE

|_|_|_|_|_|_|_| (1-8)
(DO NOT USE)

FORM B: DISPOSAL SITE INFORMATION

32002 006

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: MONSANTO COMPANY
Facility Name: MONSANTO REG. R. PLANT
Name of Site: W. G. KRUMMRICH PLANT
Address of Site:
no. street
SAUGET ILL 6[illegible]
city state zip code

Name of Owner (while used by facility): MONSANTO CO.
Address: 800 N. LINDBERGH BLVD
no. street
ST. LOUIS MO 63166
city state zip code

Current Owner (if different from above):
Address:
no. street
city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [1] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[2][7] (13-14)
4. Year first used for process waste from this facility ..... 19[7][2] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7][2] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... |-|-|-|-|-|-|-| (19-26)
   hundred tons 0.30 (27-33)
   thousand cubic yards ..... |-|-|-|-|-|-|-| (34-41)
   30 TONS
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [3] (42)
   landfill, mixed industrial waste ..... [3] (43)
   landfill, drummed waste ..... [3] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [3] (49)
   treatment (eg. neutralizing)..... [3] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [3] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [9] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

TO BE REPORTED ON THE SUBMITTAL FROM THE W. G. KRUMMRICH PLANT

FORM B CONTINUED ON SECOND PAGE

[1] (80)

Form B - Page 2

(DO NOT USE)

Company Name: [illegible]

Facility Name: [illegible] RIVER PLANT

Site Name: [illegible]

32002 006

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>10	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	9	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	9	(23)
zinc, cadmium, copper, chromium (trivalent)	2	(24)
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >3^{50} pico curies/liter	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
pesticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	2	(43)
plastizers	2	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	2	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	2	(53)
esters and ethers	2	(54)
alcohols	2	(55)
ketones & aldehydes	2	(56)
dioxins	2	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	2	(67)
wastes with flash point below 100° F	2	(68)

2 (80)

[ ][ ][ ][ ][ ][ ][ ] (1-8)
(DO NOT USE)

32017 007

FORM B: DISPOSAL SITE INFORMATION

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: Monsanto Company
Facility Name: John F. Queeny Plant
Name of Site: WSK Landfill
Address of Site: [illegible]
no. street
Sauget, IL. 62201
city state zip code

Name of Owner (while used by facility): Monsanto Company
Address:
no. street
city state zip code

Current Owner (if different from above):
Address:
no. street
city state zip code

1. Location (1= the property on which facility is located; 2= off-site) ..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership) ..... [1] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [1] (12)
   IF CLOSED, specify year closed ..... 19[7][8] (13-14)
4. Year first used for process waste from this facility ..... 19[5][7] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7][7] (17-18)
6. Total amount of process waste from this facility disposed at site:
   thousand gallons ..... [ ][ ][ ][ ][ ][ ][ ] (19-26)
   hundred tons ..... [ ][ ][ ][ ][ ][1][9][8] (27-33)
   thousand cubic yards ..... [ ][ ][ ][ ][ ][ ][ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [3] (42)
   landfill, mixed industrial waste ..... [2] (43)
   landfill, drummed waste ..... [2] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [3] (49)
   treatment (eg. neutralizing) ..... [3] (50)
   reprocessing/recycling ..... [3] (51)
   other (specify) ..... [3] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [2] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

Monsanto Co.

W. G. Krummrich Plant

Sauget, Illinois

FORM B - Page 2

(1-8) (DO NOT USE)

32017 007

Company Name: Monsanto Company

Facility Name: John F. Queeny Plant

Site Name: WGK Landfill

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	9	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	9	(15)
Base solutions, with pH>~~10~~12	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	9	(20)
arsenic, selenium, antimony	9	(21)
mercury	9	(22)
iron, manganese, magnesium	9	(23)
zinc, cadmium, copper, chromium (trivalent)	9	(24)
chromium (hexavalent)	9	(25)
lead	9	(26)
Radioactive residues, >~~3~~ pico curies/~~liter~~ 50 ml	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
~~pesticides~~ insecticides & intermediates	2	(35)
herbicides & intermediates	1	(36)
fungicides & intermediates	9	(37)
rodenticides & intermediates	9	(38)
halogenated aliphatics	1	(39)
halogenated aromatics	1	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	1	(42)
amides, amines, imides	1	(43)
plastizers	1	(44)
resins	1	(45)
elastomers	9	(46)
solvents polar (except water)	1	(47)
carbontetrachloride	2	(48)
trichloroethylene	1	(49)
other solvents nonpolar	1	(50)
solvents halogenated aliphatic	1	(51)
solvents halogenated aromatic	1	(52)
oils and oil sludges	1	(53)
esters and ethers	1	(54)
alcohols	1	(55)
ketones & aldehydes	1	(56)
dioxins	2	(57)
Inorganics	1	(58)
salts	1	(59)
mercaptans	1	(60)
Misc	1	(61)
pharmaceutical wastes	1	(62)
paints & pigments	1	(63)
catalysts (eg. vanadium, platinum, palladium)	1	(64)
asbestos	1	(65)
shock sensitive wastes (eg. nitrated toluenes)	9	(66)
air water reactive wastes (eg. P_4, aluminum chloride)	9	(67)
wastes with flash point below 100° F	1	(68)

Exhibit 69

MEMORANDUM

MONSANTO - Mercury Cell Process

TO: D. B. Morton

FROM: E. C. Bennett

DATE: April 20, 1970

Mr. Clary Buckley of Monsanto Company called on April 16, 1970 to discuss the **dinora cell house** and possible **mercury losses**.

Clary indicated that while there are waste discharges from the dinora cell house, they should contain little or no mercury. However, they are making a check of this and monitoring for mercury in the waste. This information should be available before long. They have been made aware of the concern on the part of the Feds for mercury losses through their active participation in the Chlorine Institute.

Clary also indicated that an article was available from the Purdue Conference of last year or from the Chlorine Institute which gave a considerable amount of information on this particular subject. The article is "Reduction of Mercury in Waste Water for Chlorine Plants" by H. O. Bouving and P. Ullman. Apparently the proceedings of the Purdue Conference of 1969 have not as yet been sent out, therefore, we would have to specifically request this from Purdue or from the Chlorine Institute.

Ernest C. Bennett
Sanitary Engineer

ECB:sf

CONFERENCE NOTES

MONSANTO COMPANY: MERCURY
(Sauget)

DATE: May 21, 1971

A conference was held at the U.S. Environmental Protection Agency Water Quality Office, 33 East Congress Parkway, Chicago, to review progress by the Monsanto Company to reduce the Mercury in the effluent discharged from their Sauget Plant to the muncipal sewage treatment works. The following were present:

Glen D. Pratt	- Regulatory Program, Fed. EPA, Chicago
Fred W. Albonitz	- Sauget Village Plant Superintendent
Paul B. Hodges	- Manager Environmental Engineer, Monsanto
Paul E. Heisler	- Dir. of Environmental Control, Monsanto Sauget Plant
Darold W. Jackson	- Gen. Supt. of Plant Technical Services - Monsanto
Silvan B. Lutkewitte	- Technical Production Specialist - Monsanto
John J. Forneris	- Manager, Surveillance Section, BWPC, IEPA
Benn J. LeTand	- Supervisor, DesPlaines Surveillance Unit, BWPC, IEPA
William L. Blaser	- Director, Illinois Environmental Protection Agency
James C. Paccione	- Supervisor, Permit Section, Chicago Area, IEPA
R. W. Libby	- Chief, Technical Activities Branch, LMBO, U.S. EPA
Lowell A. VanDen Berg	- Deputy Dir., Div. of Field Invest., EPA, Cincinnati, O
J. M. Pappas	- Head, Surveillance Section, LMBO, U.S. EPA
Francis T. Mayo	- Regional Director, Region V, W.Q.O., EPA
Dale S. Bryson	- Deputy Director, Office of Regulatory Program, EPA

At the start of the conference, the Monsanto representatives objected to the presence of a Water Quality Office Attorney since Monsanto was not also represented by counsel. They were willing to participate in a "technical" session only. The Water Quality Office attorney then left the room.

Monsanto presented information on their facilities for removal of mercury from the chlor-alkali plant. A flow chart was submitted.

Sulfide treatment process, controlled by ORP, has been installed. Layer filters (gravel-sand-coal) have proved more effective than coal filters. A carbon filter is being installed for testing.

Chlorine has been manufactured on this site for 43 years; type of cells have been changed 5 times; now using the Donora type system.

Currently a $600,000 project is under construction to separate all contaminated flows for discharge to two new 400,000 surge tanks; to be completed July 1, 1971.

Currently (April '71 average) the effluent contains about 1.3 lbs of Hg per day in 150,000 gpm of flow. This is not in compliance with the Illinois Pollution Control Board limit of 0.5 lb/day.

Director Blaser commented that Monsanto appeared to be making a drastic effort to improve, however, not effective enough to meet the State requirement. A "variance" may be required.

Monsanto representatives believe they are "close" to State limits. To date they have concentrated on the chlor-alkali portion of the plant. They are studying the rest of the plant to locate other sources of mercury. Procedures have been developed to recover all mercury spills. Mercury in acids and caustics is a problem.

A detailed discussion was then held concerning the results of the survey made by the Water Quality Office on January 13, 1971. Their survey showed 0.209 lb Hg per day in 2700 gpm flow from the chlor-alkali area and 12.26 lb Hg/day in 3650 gpm from the other processes. There appeared to be no logical explanation for the latter.

A telephone call to the plant obtained the following current data: Other processes (24" sewer) - 0.040 ppm of Hg in 4,050 gpm flow or 1.95 lbs/day; chlor-alkali (36" sewer) - 0.014 ppm of Hg in 3500 gpm flow or 0.59 lbs/day.

Monsanto proposes to have their equipment installed by July 1, 1971. Will need to October 1, 1971 to shake-down and reduce to 0.5 lb/day of Hg. Will have to conduct intensive study to locate sources of mercury in 24" sewer flow from area outside of chlor-alkali site.

Water Quality Office stated that Monsanto would have to reduce to 1/2 lb. of Hg per day in their effluent by August 31, 1971.

Another technical meeting was scheduled for 10:00 A.M., June 22, 1971 at the Water Quality Office. Monsanto was specifically directed to present a firm time table of their program to achieve the Federal and State requirements.

Benn J. Leland, Supervisor
DesPlaines Surveillance Unit, BWPC

BJL:arl

UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER QUALITY ADMINISTRATION
GREAT LAKES REGION
LAKE MICHIGAN BASIN OFFICE
1819 WEST PERSHING ROAD
CHICAGO, ILLINOIS 60609

RECEIVED
JUL 9 1970
ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

July 7, 1970

Mr. Clarence W. Klassen
Technical Secretary
Illinois Sanitary Water Board
Illinois Department of Public Health
535 W. Jefferson Street
Springfield, Illinois 62706

Dear Mr. Klassen:

We are attaching for your information copy of oompleted mercury inventory form just received from the Monsanto Company for the W. G. Krummrich Plant at Sauget, Illinois.

Sincerely,

Jacob D. Dumelle

Jacob D. Dumelle
Director
Lake Michigan Basin Office

Attachment

Monsanto

ORGANIC CHEMICALS DIVISION

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166
Phone (314) 694-1000

June 26, 1970

Mr. Jacob D. Dumelle, Director
Lake Michigan Basin Office
Federal Water Quality Administration
1819 West Pershing Road
Chicago, Illinois 60609

Dear Mr. Dumelle:

Enclosed are the completed mercury inventory forms which you had sent us previously. We have included the St. Louis Plant (this is our J. F. Queeny Plant) and the Sauget Plant (our W. G. Krummrich Plant). Relative to the "Vinyl Acetate Plant", we have no such installation in Region V. Monsanto does produce vinyl acetate at one location (Texas City, Texas) but mercury is in no way involved in our vinyl acetate process.

Please advise if further information is needed. As we have told your office verbally on previous occasions, we wish to cooperate fully with your organization in this problem.

Sincerely yours,

Paul B. Hodges

Paul B. Hodges
Manager of Environmental Engineering

/np

attachments

MERCURY INVENTORY

Monsanto Company
W. G. Krummrich Plant
Sauget, Illinois
(Firm Name)

Silvan Lutkewitte
(Compiled by)

(618) 271-5635
Telephone Number

Paul B. Hodges
Manager of Environmental Engineering
Person(s) Contacted & Title

1. Annual Mercury charged to cells (1969) 39,747 #

2. How is Mercury used? In the chlorine plant as a flowing cathode. It does not enter into the reaction. Other miscellaneous uses in laboratory equipment and plant instruments.

   a. Type of plant Heavy chemicals mfg. plant - Chlorine Electrolytic mercury cells

   b. Process De Nora; utilizing 27M2 type cells.

   c. Product Chlorine, Hydrogen, Potassium Hydroxide, Sodium Hydroxide

   d. Other

3. Wastes which may contain Mercury traces are discharged to:

   a. Stream, Lake, etc. (name)

   b. Municipal Sewage Plant (name) Sauget Village Waste Treatment Plant

   c. Other Monsanto Sanitary Land Fill

4. What is being done to reduce Mercury loss? New Mercury cells are being installed, replacing older, less efficient models. Projects are being installed to reduce Mercury uses and to eliminate possibility of contamination with product, process and cooling water streams. Also, security measures are being tightened to reduce theft losses of Mercury from the cells.

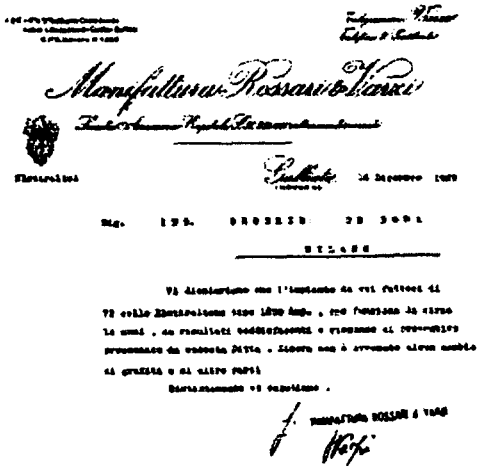
(2)

OUR HISTORY

DE NORA

S.A. Manifattura Rossari & Varzi - Gallate Elettrolysis room - 70 De Nora cells - Start-up year 1928

Founded on 1923 by Oronzio de Nora, a brilliant young engineer with a firm will, its original name was ORONZIO DE NORA IMPIANTI ELETTROCHIMICI S.p.A. While still an engineering student, Oronzio de Nora received his first request to develop and supply a chlor-alkali plant with diaphragm cells. Since then the growth and activity of his firm has been constant due to a continuos demand that became world-wide.



"We declare that the plant of 72 electrolytic cells type 1800 Amp. made by you, working since ca. 14 months, gives good results and corresponds to the estimate given by this firm. Till now there was no change of graphite or other parts. Sincerly yours. "

A firm believer, at that early time, in the importance of chlorine for the chemical industry, Oronzio de Nora developed a number of innovative prototypes of diaphragm and **mercury cathode cells** which were well received by the industry.

An ever increasing demand has led to the design and construction of many plants with outstanding technical and economic performances.

Due to the ease of their conception, and the outstanding quality of their components, several hundreds of DE NORA chlorine and caustic soda plants, built and operated in five continents, are producing more than one third of the world production.

From the very beginning Research has been for Oronzio de Nora Group the essential step in providing the technological progress necessary to obtain and maintain leadership in the field.

De Nora's activity has been continually expanding through the work of highly qualified technical people and has resulted in reliable plants for the production of caustic soda, chlorine, sodium hypochlorite, hydrochloric acid and other chlorine derivates.

Its continuous dedication to electrochemistry for over three quarters of a century, which has yielded many patented and non patented innovation, has truly made of DE NORA a brand name in this very challenging and extremely important field of chemistry.

In few words DE NORA has become a world leader in the engineering, procurement and construction of complete plants for the elctrochemical and electrometallurgical industries.

DE NORA S.p.A.
Via Bistolfi, 35
20134 Milano
ITALY
Tel. +39-02-21291
E-Mail DENORAspa@denora.it

Main Page

Corporate

Exhibit 70

71-110

VARIANCE PETITION CONTROL FORM

TO: Bureau of Legal Services
FROM: Bureau of Water Pollution Control DATE: May 25, 1971

INSTRUCTIONS: Part I is to be completed by the appropriate Technical Bureau. Upon completion, this form, plus one copy of the Petition, must be forwarded to the Bureau of Legal Services. Bureau of Legal Services should receive the form within one (1) working day from the date the Petition is received. The technical investigation should commence immediately.

Part II is to be completed by the Bureau of Legal Services. The Bureau of Legal Services is responsible for providing all required notices, in accordance with information furnished in Part I by the Technical Bureau The required notices will be mailed within one (1) working day from the date of receipt from the Technical Bureau. The notice will solicit the views of persons who might be adversely affected by the granting of the variance, as required by the statute. The notice will also indicate that comments or inquiries should be addressed to the Technical Bureau in Springfield or the Regional Office involved.

Part I:

1. Name and address (including county) of Petitioner; also name and address (including county) of location of the installation or property involved, if different:
Monsanto Company, W. G. Krummrich Plant, Monsanto Branch Post Office, East St. Louis, Illinois 62201, St. Clair County

2. Brief description of variance sought, including expiration date and section numbers of the statute and/or regulations involved:
Petitioner seeks relief from the mercury regulation R70-5, seeking to discharge mercury in excess of 0.5 ppb.

3. Date petition received by Agency: May 14, 1971

4. Name and telephone extension of staff engineer in charge of investigation:
Thomas G. McSwiggin Ext. 6171

5. Name, address and telephone number of Regional Office and/or engineer(s) who will make the technical investigation: South Central Regional Office, Environmental Protection Agency, 9500 Collinsville Road, Unit E, Collinsville, Illinois 62234
Phone: 618-345-6220

6. Name and address of any person(s) in the county in which the installation or property involved is located who has in writing requested notice of variance petitions:
None Known.

7. Remarks:

Thomas G. McSwiggin
Signed

BY THE ILLINOIS POLLUTION CONTROL BOARD

MONSANTO COMPANY, a corporation,	)	
Petitioner,	)	71-110
vs.	)	
ENVIRONMENTAL PROTECTION AGENCY,	)	

PETITION FOR VARIANCE

Comes now the Petitioner, MONSANTO COMPANY, a corporation, by its attorneys, Harlan L. Hackbert and W. Gerald Thursby, petitioning for a variance from the Mercury Regulations adopted by the Pollution Control Board in Docket No. R70-5. In support of its petition, petitioner shows to the Board:

1. Petitioner Monsanto Company owns and operates at Sauget, Illinois an industrial plant known as its "W. G. Krummrich Plant", one portion of which is a chlor-alkali facility. Mercury is not used by petitioner as a raw material but in the chlor-alkali process mercury is used as a carrier of sodium or potassium ions and a conductor of electricity in the following manner:

Chlorine is manufactured in this process by passing a direct current through a flowing salt (NaCl or KCl) brine. The current flows from a fixed anode through

the brine to a flowing mercury cathode. The electrical energy converts the salt to chlorine gas which is used in other processes and to a mercury-sodium (or potassium) amalgam. This amalgam is passed through a decomposer where it is reacted with water and forms caustic soda (NaOH) or potassium hydroxide (KOH), hydrogen gas, and elemental mercury. The mercury is then returned to the cell to be reused as the cathode. The NaOH or KOH is processed and sent to storage and the hydrogen is processed and compressed for use in other processes.

2. The effluents from the Krummrich Plant, including the chlor-alkali facility are discharged from the plant sewage system into the sewers of the Village of Sauget and are treated and discharged into the Mississippi River opposite the village.

3. Petitioner has employed the firm of Ryckman, Edgerley, Tomlinson and Associates, Inc. to make tests of the mercury content of the Mississippi River both above and below the Sauget outfall. The samples thus taken on May 1, 1971, as analyzed at the Environmental Trace Substances Center, University of Missouri, are shown on Exhibit A attached hereto.

Samples taken by petitioner's personnel on April 25, 1971, and analyzed in petitioner's laboratory showed substantially the same results as shown by Exhibit B attached hereto. Based upon these

analyses, petitioner alleges that the total emissions discharged from the Sauget outfall only temporarily and for a short distance downstream has the effect of increasing the mercury content above .5 ppb and presents no measurable change in the background level of the river or resultant injury to the public.

4. Since March, 1970, when it was first generally recognized that the presence of inorganic mercury in the environment could be transferred into organic-mercurials such as methyl mercury, petitioner has proceeded promptly and diligently with a program for the treatment and reduction of the mercury content of the emissions from its chlor-alkali facility into the plant sewage system and, ultimately, into the sewers of the Village of Sauget. Petitioner has completed the modernization of its chlor-alkali facility by the installation of steel bottom cells and dimensionally stable anodes, and other equipment which is reducing the quantity of mercury used in the process; this at a cost of $1,500,000.

At an additional capital expenditure which will total $600,000, coupled with a research and engineering program costing $400,000, petitioner is presently engaged in the construction of a plant employing a sulfide mercury removal process, and in the relocation of the waste water and sewage disposal system of the chlor-alkali facility so as to process all such emissions through the sulfide treatment plant before discharge into the village sewers. That treatment unit

is in partial operation and will be completed in July, 1971, and it is expected that when in full operation the mercury emission from the chlor-alkali facility will be reduced from the present emission of 1.0 - 1.5 lbs. per day to 0.5 lb. per day.

5. Under present technology there is no technically feasible process to reduce the mercury effluent level in a mercury cell chlor-alkali unit to the .5 ppb standard contained in the Board's Regulation R70-5. Unless petitioner is granted a variance from that regulation, petitioner will be obliged to terminate the operation of its chlor-alkali facility, which is the only facility of this character in the State of Illinois. If granted a variance, petitioner proposes to maintain a continuing research program to develop a feasible process to recover mercury values. Petitioner is presently researching several processes which, if technically feasible, might further reduce the mercury emission from its chlor-alkali facility. Granting a variance would permit petitioner to continue this research program and to continue the operation of its chlor-alkali facility which, as the tests referred in paragraph 3 demonstrate, does not even at present emission levels present any meaningful effect on the mercury content of the Mississippi River.

6. Enforcement of Regulation R70-5 against petitioner without a variance would impose an arbitrary or unreasonable hardship without any corresponding benefit either to the environment or the public

welfare. Petitioner will sustain a complete loss of the $2,500,000 expenditure which it has made in a good faith effort to reduce its mercury levels to a reasonable standard which it had hoped the Board would establish. The chlor-alkali equipment is not suitable for use in the other chemical-producing processes in the Krummrich Plant, and the useful value of the chlor-alkali facility will be destroyed. Petitioner will be put to additional expense in the purchase of chlorine, NaOH, KOH, and, particularly, of hydrogen from outside sources of supply, and will be put at a competition disadvantage in the sale of its products. Petitioner will be unable to continue its sales of KOH with resultant loss of profits. Some 60 or 70 employees will no longer be required.

7. Petitioner respectfully requests that this petition be set for hearing at which it may introduce evidence in support of this petition.

WHEREFORE Petitioner, MONSANTO COMPANY, prays that an order be entered exempting it from the provisions of the Mercury Regulations adopted by the Pollution Control Board in Docket No. R70-5 in accordance with the provisions of Section 35 of the Environmental Protection Act, or, in the alternative, in accordance with the provisions of Section 36 of the Act, for a period of one year to enable petitioner to complete and place in operation its present program,

and to continue its proposed research program.

HARLAN L. HACKBERT

W. GERALD THURSBY

Attorneys for Petitioner

Hackbert, Rooks, Pitts,
Fullagar and Poust
208 South LaSalle Street
Chicago, Illinois 60604
FR2-5600

EXHIBIT A

MISSISSIPPI RIVER SAMPLE RESULTS

Sampling by Ryckman, Edgerley, Tomlinson and Associates, Inc.

Analyses by Environmental Trace Substances Center, University of Missouri

Sampling Date - 5/1/71

(1) Sauget Village Outfall - Sampled 6:30 pm 4/30/71 to 2:00 pm 5/1/71 continuously - 6.8 ppb

(2) Check by lab. against Federal Water Quality Office - 0.18 ppb vs. 0.18 ppb measured

	Station River Miles	Mo. Bank	Mercury ppb *								Ill. Bank
			Mid-River								
			①	①	↓		①		①		
A.	178.9	4500' Above Sauget	<0.05	<0.05	0.10		<0.05		<0.05		
B.	178.6	3000' Above Sauget	<0.05	<0.05	<0.05		<0.05		<0.05		
C.	173	500' Below Sauget	<0.05	<0.05	<0.05	<0.05	<0.05	1.12	<0.05	<0.05	
D.	177.3	Phillips Dock	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	
E.	176.5	Cooper Terminal	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
F.	175	Federal Barge	<0.05	0.10	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	
G.	173	Continental Grain	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	

* Flameless Atomic Absorption Method

① Samples from centers of quarter sections of the river

EXHIBIT B

RIVER STAGE 15.9'

MISSISSIPPI RIVER SAMPLING RESULTS

Sampled and Analyzed by Krummrich Plant Personnel and Laboratory

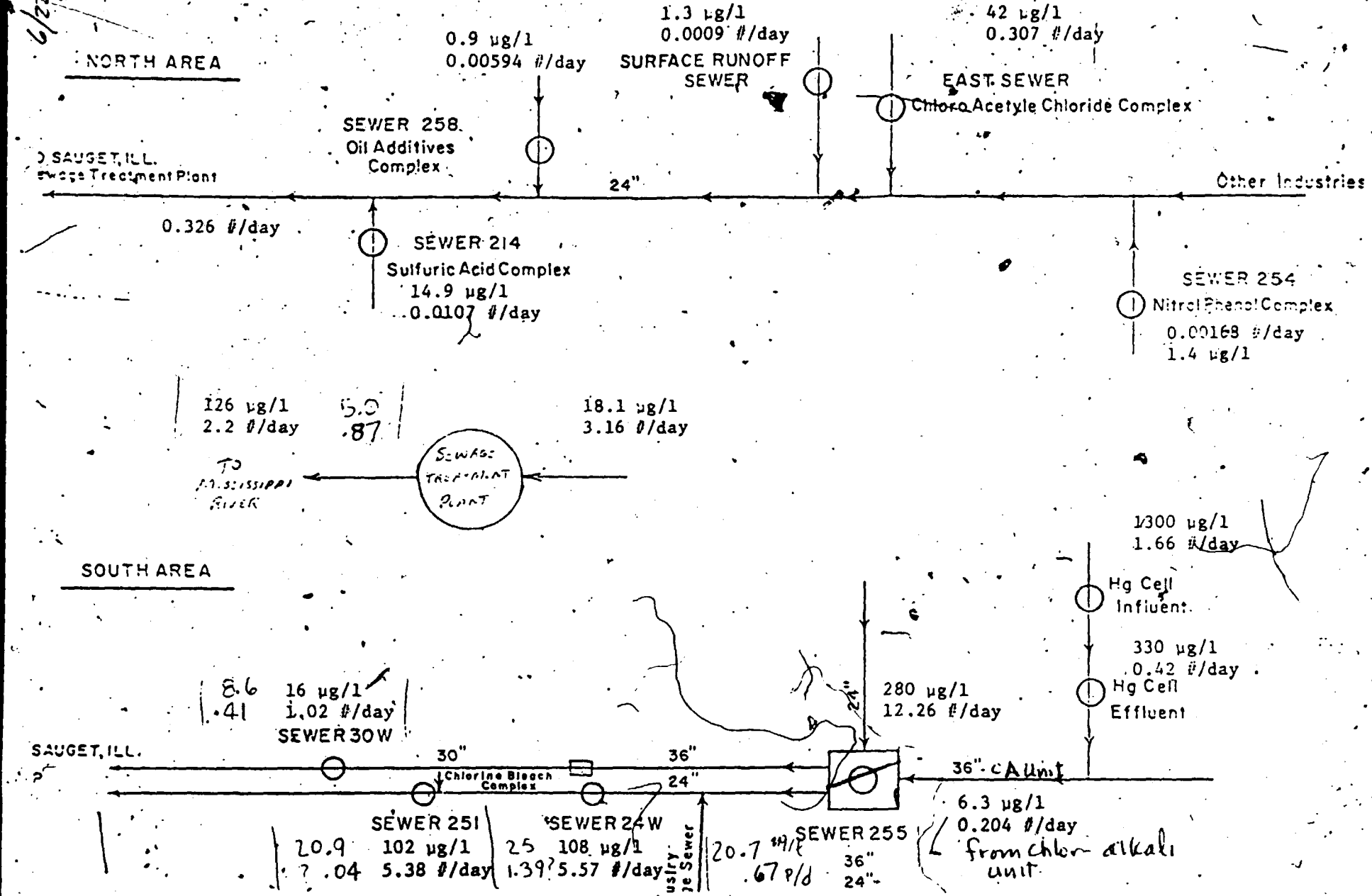
Sampling Date - 4/25/71

Station River Miles		Mercury ppb * Mo. Bank	Mid-River			Ill. Bank
		(1)	(1)	↓	(1)	(1)
178.9	4500' no. of Sauget Outfall (Peabody Coal sign, no. of Poplar St. Bridge)	<0.5	<0.5	<0.5	<0.5	0.5
178.6	3000' no. of Sauget Outfall (about 300' so. of MacArthur Bridge)	<0.5	0.5	<0.5	47.7	<0.5
178.3	1500' no. of Sauget Outfall	1.1	6.1	<0.5	<0.5	<0.5
178	200' so. of Sauget Outfall	1.0	<0.5	0.9	<0.5	0.5
178	500' so. of Sauget Outfall	0.7	<0.5	<0.5	<0.5	0.9
177.7	1500' so. of Sauget Outfall	0.5	<0.5	<0.5	<0.5	1.3
177.3	Phillips Dock	<0.5	<0.5	<0.5	<0.5	<0.5
176.5	Cooper Terminal - Mobil Oil	<0.5	<0.5	<0.5	<0.5	<0.5
175	Arsenal Island - Fed. Barge	<0.5	0.7	<0.5	<0.5	<0.5
173	No. of River Des Peres Contin. Grain Elev.	<0.5	<0.5	0.7	<0.5	<0.5
168.5	About 200' so. of Jeff. Barr. Bridge	<0.5	<0.5	<0.5	<0.5	<0.5
165.5	Luhr Bros. - 3 mi. so. of Jeff. Barr. Bridge	<0.5	<0.5	<0.5	<0.5	<0.5

* Flameless Atomic Absorption Method
(1) Samples from mid-point of each quarter section of the river

SAUGET, ILLINOIS
SEWER FLOW PATTERNS

FIGURE I



M E M O R A N D U M

SAUGET - Monsanto Company (Mercury)

TO: Division of Water Pollution Control, Surveillance Section

FROM: M. G. Neumann, Engineer, Mississippi Basin

DATE OF VISIT: July 22, 1971

INTERVIEWED: Paul E. Heisler, Dir. of Env. Control
J. W. Malloy, Monsanto Engineer
S. B. Lutkewitte, Monsanto Engineer
George Hudson, Monsanto Foreman

On the above date, Engineer Robert Schleuger and the writer conducted an operational survey of Monsanto's treatment facility for its chlor-alkali process located at its W. G. Krummrich Plant. Every two years the W. G. Krummrich Plant shuts down for one week to make needed repairs and safety checks. Since the plant was shut down for these repairs and checks at the time of the survey, neither the chlor-alkali process nor the treatment facility was in operation.

The treatment facility consists basically of a sump, two (2) 400,000 gallon storage tanks, treatment with sodium hydroxide sulfide, sedimentation, sand filter, two carbon filters, and micron polishing filters. The filters are backwashed after every shift with treated effluent. The final effluent then goes to two (2) 400,000 gallon storage tanks where it is tested and either discharged to the sewer system or re-cycled. Flow through the facility has reached 200 gpm, but efforts are being made to reduce this down ~~to~~ 100 gpm.

The Monsanto representatives pointed out that the facility is still in the experimental stage and that changes and alterations could occur. Extensive sampling of the chlor-alkali facility and Monsanto's sewer system will be carried out in the near future.

M. G. Neumann

MGN/cas
7/27/71

cc: Mississippi Basin
cc: Div. of Legal Services

RICHARD B. OGILVIE
Governor

September 8, 1971

WILLIAM L. BLASER
DIRECTOR

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY

RECEIVED
SEP 08 1971
ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

FOR IMMEDIATE RELEASE

Contact Joe Finnigan
525-5562

EPA Recommends Granting of Part of Monsanto/Sauget Water Pollution Variance Request

The Illinois Environmental Protection Agency has recommended that the Illinois Pollution Control Board grant a one-year variance to one part of the Monsanto Company's W.G. Kummrich Plant at Sauget (So-Jay), Illinois. The variance would excuse the chlor-alkali portion of the plant from Board regulations on the control and discharge of the chemical mercury.

In its recommendation, the EPA notes that the Monsanto Company requested the variance for the entire Kummrich plant, but that the variance petition filed is concerned only with the chlor-alkali facility and fails to discuss any mercury discharge abatement program for the rest of the plant. The variance hearing in the case is scheduled for 9:30 a.m. on Thursday, September 9 in the Village Hall, 2897 Monsanto Street, Sauget.

The EPA recommendation to grant the variance is based on the position that Monsanto already has "made great progress" in removing mercury from the effluent of its chlor-alkali facility. The Agency notes, however, that still more improvement is possible at the chlor-alkali operation, and that apparently other mercury discharge problems from the plant currently continue unabated.

Ad 1.

Discharges from the Kummrich plant are treated at the Sauget Sewage treatment works. Treated wastes then are emitted into the Mississippi River.

The EPA recommendation that a one-year variance be granted to the chlor-alkali portion of the Kummrich plant is subject to the conditions that only a limited, "appropriate" level of mercury discharge be permitted by the Board; that the variance establish a schedule for the further and progressive improvement of the mercury concentration of the plant's effluent; that monthly reports be submitted on mercury concentrations from all portions of the plant during the variance period; and that Monsanto post a performance bond to insure compliance with any Pollution Control Board orders.

RECEIVED
JAN 3 1972
ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

Monsanto

Monsanto Company
Sauget, Illinois 62201
Phone: (618) 271-5835

January 4, 1972

Mr. D. P. Currie
Illinois Pollution Control Board
309 West Washington Street
Chicago, Illinois 60606

Dear Mr. Currie:

In compliance with the conditions of Order 4 of the Variance granted to Monsanto Company on November 8, 1971 from the operation of the Mercury Regulation, we are herein submitting the first report covering the period of November 1 through December 31, 1971.

Waste Water Storage Tanks Before Discharge

Average Flow	- 100 GPM
Average Concentration Discharged	- 64 ppb
Average Daily Discharge to Sewer	- 0.077 lbs.per day

Total Plant

Average Flow	- 7470 GPM
Average Concentration	- 5.6 ppb
Average Daily Discharge to Sewers	- 0.502 lbs.per day

The following progress was made in our Mercury Abatement Program:

Mercury concentration in Chlor-Alkali waste water storage tanks was too high for release into village sewers on 13 days in this reporting period due mainly to the unseasonable precipitation rate and on a few occasions due to processing difficulties. On these occasions the waste water was rerouted for further treatment in order to control discharges below the established level.

During this initial reporting period, numerous difficulties were encountered with our sampling equipment - i.e. freeze-ups, mechanical breakdowns and contamination of the samplers from the heavy rains. These heavy rains also necessitated the cleaning of all sewer boxes which became full of interferring type solids.

We trust this fulfills your needs for our monthly reports. Should additional information, data or clarifications be required please advise us.

Very truly yours,

P. E. Heisler
Director of Environmental Control

/ghw

cc: Illinois Environmental Protection Agency
Division of Water Pollution Control Surveillance
2200 Churchill Road
Springfield, Illinois 62706

Illinois Environmental Protection Agency
117 West Main Street
Collinsville, Illinois 62234

Attention: Robert Schleuger

December 8, 1972

Pollution Control Board
309 West Washington Street
Suite 300
Chicago, Illinois 60606

Attention: Christan L. Moffett, Clerk

Gentlemen:

Attached is a verification of the petition filed by Monsanto Company with the Pollution Control Board on August 10, 1972, requesting an extension for an additional year of the variance previously granted by the Board in PCB 71-110. This verification by a Vice President of Monsanto is in compliance with condition 2 of the Order of the Board in PCB 72-336.

A copy of the attached verification is being sent to the Environmental Protection Agency.

Very truly yours,

Phocion S. Park
Senior Attorney

PSP/pa
Enclosures

cc: Mr. L. D. Hudson, Manager
Variance Section
Division of Water Pollution Control
Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

STATE OF MISSOURI }
COUNTY OF ST. LOUIS } SS

C. P. Cunningham, being duly sworn deposes and says that he is a Vice President of Monsanto Company, which Company has heretofore filed a Petition for Extension of Variance in Docket PCB 71-110 before the Pollution Control Board of the State of Illinois (new Docket number PCB 72-336); that he is familiar with the information contained therein, and that to the best of his knowledge and belief such information is true, complete and accurate; that for the purpose of identification, a copy of said Petition for Extension of Variance is attached hereto marked Exhibit A and herewith made a part hereof.

Subscribed and sworn to before me, a Notary Public in and for the County and State aforesaid, this 7th day of October, 1972.

Notary Public

My commission expires Oct. 21, 1975.

EXHIBIT A

BY THE ILLINOIS POLLUTION CONTROL BOARD

MONSANTO COMPANY, a corporation, Petitioner, vs. ENVIRONMENTAL PROTECTION AGENCY,	PCB 71-110

PETITION FOR EXTENSION OF VARIANCE

Comes now the Petitioner, MONSANTO COMPANY, a corporation, by its attorneys, Randall Robertson and Phocion S. Park, petitioning for an extension of the variance granted by the Pollution Control Board in PCB 71-110 in an Opinion and Order of the Board dated November 8, 1971. Said variance permitted Monsanto, subject to certain conditions, to discharge mercury up to 0.5 lbs. per day as a daily average. The variance was granted for a period ending November 7, 1972.

In support of its petition for an extension of said variance, Petitioner shows to the Board:

1. Petitioner has fulfilled all conditions which formed a part of the variance granted on November 8, 1971, and pursuant to which Petitioner is now operating.

2. Actions taken by Petitioner over the last year to reduce the amount of mercury discharged and resulting in the reduction of mercury discharges into the public sewers of the Village of Sauget from 0.72 lbs. per day in August, 1971, to an average of 0.33 lbs. per day for the six month period ending with July, 1972.

3. Since the issuance of the present variance on November 8, 1971, the following programs aimed at the reduction of mercury discharges have been developed or strengthened in both the chlor-alkali operation and in other plant areas and activities. These are as follows:

A. Chlor-alkali Area:

(1) Greater backup protection

Installation of the equipment described to the Board in the hearing of September 9, 1971, has been completed. This includes installing spare pumps and critical pieces of instrumentation to improve equipment reliability. Backup protection is now much improved.

(2) Control of waste water pH

Through examination and improvement in technology, waste water pH is being controlled so as to

minimize the concentration of mercury in the effluent stream.

(3) Increased use of recycle water

By increased use of recycle water, flow rates of 100-110 gpm last year have been reduced to 60-70 gpm today.

(4) Storage of treated waste water

All treated waste water is held in storage until laboratory analysis has determined that maximum treatment for mercury removal was obtained. Any analysis which reveals faulty treatment causes the material to be reworked. Normal discharges are in 30-50 ppb (or .04-.06 pounds per day) range.

(5) Use of additional manpower

Four full time operators have been added to insure that all systems and backup systems are operational 24 hours a day, 7 days a week.

(6) Engineering Study

An investigation was made of the possibility of using other methods to manufacture chlor-alkali products. A report of this investigation, together with the conclusion that no other methods were practical alternatives, was made

to the Pollution Control Board and the Environmental Protection Agency on April 20, 1972.

Petitioner is continuing to study and/or implement additional steps to reduce the effluent flow rate and the concentration of mercury in the effluent.

B. Other Areas of Plant: An extensive monitoring program has indicated that the chlor-alkali area is completely isolated from the rest of the plant. By making preliminary calculations with some assumptions on mercury concentrations, it is estimated that approximately 0.25 pounds of mercury per day from all other sources are lost to the sewers.

(1) Instrumentation

A September, 1971 survey revealed there were about 900 pounds of mercury in some 2,000 instruments in the plant. Two-thirds of this mercury is concentrated in standard power plant flow meters.

Among the steps which have been taken to eliminate or control this potential source are these: replacement with non-mercury instruments where economically justified or through normal attri-

tion; design of non-mercury instrumentaion; a "make safe" program for those instruments which cannot be economically replaced or where no replacement exists. To date 103.3 pounds of mercury have been eliminated. The 600 pounds of mercury in the power house flow meters are being cared for by authorized instrument mechanics who have received special instruction to prevent loss.

(2) Raw Materials

At present, 29 of 80 raw materials cannot be analyzed with existing methods for mercury. Petitioner's Research Department is pursuing this problem in its own labs, as well as by surveying non-owned analytical service labs.

(3) Atmospheric fall-out

A program of routine cleaning of sewers has been established, with the sewers having been cleaned in September, November, and December of 1971, and June of 1972. Reductions in mercury level in waste water were noted after all sewer cleanings with the exception of the December cleaning. Petitioner will continue to review monitoring data and alter cleaning procedures for the sewer system as necessary.

(4) Improvement in sampling equipment and methods

Additional maintenance effort has increased the dependability of the sampling equipment. Also, Petitioner is investigating new equipment/sampling techniques to provide even more reliable samples.

(5) Reduction of water usage

Closely associated to mercury reduction is a plantwide program to reduce water usage in processes and waste water discharges from these processes. Discharges from plant average 8000 gpm in 1971, less than 7000 in 1972. Petitioner's goal is less than 3500 gpm. In areas where there will be treatment before discharge, the removal or reduction of mercury contamination, if present, will be considered.

A final potential plantwide source of mercury are cracks, crevices, and joints in the plant sewer system. A gradual reduction in any contribution made from these sources is anticipated as control programs are developed and implemented.

4. Paragraphs 6, 7 and 8 of PETITIONER'S AMENDED PETITION FOR VARIANCE filed with the Board in PCB 71-110 continue to be true and to accurately describe Petitioner's

operations and inability to meet the 0.5 parts per billion mercury discharge regulation. As stated in said Paragraph 6, Petitioner's operations result in no measurable change in the background mercury level of the Mississippi River nor in any resultant injury to the public.

WHEREFORE, Petitioner, MONSANTO COMPANY, prays that an order be entered, extending the variance previously granted by the Pollution Control Board on November 8, 1971 in PCB 71-110 for an additional period ending November 7, 1973.

Randall Robertson
Lueders, Robertson & Konzen
1939 Delmar Avenue
Granite City, Illinois 62040

Phocion S. Park
Monsanto Company
800 North Lindbergh Blvd.
St. Louis, Missouri 63166

By Phocion S. Park

Attorneys for Petitioner

CONFIDENTIAL - INTERNAL COMMUNICATION OF THE ILLINOIS EPA

MEMORANDUM

VARIANCE REPORT ON: Monsanto Company, 800 N. Lindbergh Blvd., St. Louis, Mo.
Re: W. G. Krummrich Plant, St. Clair County, Illinois

DATE: August 17, 1972

TO: Enforcement Services Section - DWPC

FROM: James A. Janssen, Variance Section - DWPC

The Variance Section, DWPC, has reviewed the Petition for Extension of Variance PCB 71-110 submitted by the Monsanto Company. This Section concludes the following:

1) All conditions have been met by Monsanto as required in PCB 71-110.

2) Constant effort has been made by Monsanto in seeking compliance with Rule 408, as expressed by Eric Merz, Surveillance Section, Mississippi Basin, Direct Sub-Unit.

3) Commendable progress has been made by Monsanto in abating its mercury pollution problem as is evident by reviewing their monthly reports.

4) More time is obviously required by Monsanto to meet the PCB Water Pollution Regulation 408(c). Certainly the complex Monsanto problem cannot be solved overnight. With the evidence submitted and as expected, Monsanto is much closer to solving their problem today than they were a year ago.

The petition succinctly describes the details defining the reduction in mercury discharges, progress made toward compliance, and the impact of continuing some discharge of mercury.

In view of the above, the Variance Section, DWPC, recommends that this variance be granted with provision that:

1) Variance should be granted to the extent of permitting discharge of mercury up to 0.4 pounds/day as a daily average.

2) Variance should extend to November 7, 1973.

3) Monsanto shall continue to sample and analyze the mercury-bearing waste water which is alternately put in one of the two storage tanks prior to release to the Village sewers and treatment plant. If the concentration of mercury is too high the wastes must be re-routed for further treatment.

4) Monsanto shall continue to submit to the EPA and the Board monthly reports on the progress of its mercury abatement program. The reports shall include a listing of the mercury concentration of the waste water storage tanks before discharge and shall be submitted a reasonable time after the end of the month.

5) Monsanto shall submit to the EPA and the Board by December 31, 1972, a comprehensive report dealing with the progress made in their mercury abatement program, defining progress already completed in the program, and a schedule for bringing th facility into compliance.

Please advise if you have any questions on this report.

cc: -Surveillance Section, Springfield/DWPC
-Surveillance Section, Collinsville/DWPC
-Records Unit/DWPC

JAJ/vb

Attachment: Monsanto's Progress Reports covering period from 11/1/71 - 7/31/72

VARIANCE PETITION CONTROL FORM

TO: Enforcement Services Section - DWPC
FROM: Division of Water Pollution Control - Variance Section
DATE: August 11, 1972

INSTRUCTIONS: Part I is to be completed by the appropriate Technical Division. Upon completion, this form, plus one copy of the Petition, must be forwarded to the Enforcement Services Section. Enforcement Services Section should receive the form within one (1) working day from the date the Petition is received. The technical investigation should commence immediately.

Part II is to be completed by the Enforcement Services Section. The Enforcement Services Section is responsible for providing all required notices, in accordance with information furnished in Part I by the Technical Division. The required notices will be mailed within one (1) working day from the date of receipt from the Technical Division. The notice will solicit the views of persons who might be adversely affected by the granting of the variance, as required by the statute. The notice will also indicate that comments or inquiries should be addressed to the Technical Division in Springfield or the Regional Office involved.

Part I:

1. Name and address (including county) of Petitioner; also name and address (including county) of location of the installation or property involved, if different:
Monsanto Company, 800 N. Lindbergh Boulevard, St. Louis, Mo. 63166, relating to company discharge to sewers of Village of Sauget.

2. Brief description of variance sought, including expiration date and section numbers of the statute and/or regulations involved:
Extension of Variance PCB 71-110 granted November 8, 1971.

3. Date Petition received by Agency: August 9, 1972

4. Name and telephone extension of staff engineer in charge of investigation:
James A. Janssen, Telephone: 217/525-6171

5. Name, address and telephone number of Regional Office and/or engineer(s) who will make the technical investigation:
Robert Schleuger, 117 W. Main, Collinsville 62234, Telephone: 618/345-6220

6. Name and address of any person(s) in the county in which the installation or property involved is located who has in writing requested notice of variance petitions:
None known.

7. Remarks:

Copies: Enforcement Services Section (2)
Surveillance Section
Permit Section

L. D. Hudson

Signed
L. D. Hudson, Manager, Variance Sectic
Division of Water Pollution Control

August 27, 1971

CERTIFIED MAIL

Miss Regina Ryan, Clerk
Pollution Control Board
189 West Madison Street
Chicago, Illinois 60602

Re: MONSANTO COMPANY
PCB 71-110

Dear Miss Ryan:

Enclosed herewith is the original and nine (9) copies of the Agency's Recommendation in the above entitled matter.

Yours very truly,

Roger C. Ganobcik
Division of Legal Services
Environmental Protection Agency

RCG/ssm
encls.
cc: Hackbert, Rooks, Pitts,
Pullagar, and Poust (w/encl.)
J. Keehner, AG (w/encl.)
Div. of Water Pol. Con. (w/3 encls.)
J. Finnigan (w/encl.)
P. Prillaman (w/encl.)
K. Erlich

State of Illinois)
) SS:
County of St. Clair)

BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

IN THE MATTER OF:)
)
Petition for Variance of:) PCB 71-110
)
MONSANTO COMPANY)

RECOMMENDATION

The Environmental Protection Agency has investigated this Petition, and makes the following recommendations:

1) This Petition was received by the Agency on or about May 17, 1971. I seeks complete exemption from Mercury Regulation R70-5 for the entirety of Pet tioner's "W.G. Krummrich Plant" at Sauget, Illinois. However, the information required of a petition for variance by Procedural Rule 401(a) of the Rules and Regulations of the Illinois Pollution Control Board has been provided in this petition for only part of that plant, the chlor-alkali facility.

2) The Petition describes various attempts to control the discharge of Mercury. However, these attempts are all directed to the chlor-alkali facilit No programs for abatement of the discharge of mercury are described as to the remainder of the plant. Further, no specific level of mercury concentration is proposed as an alternate to the 0.5 ppb limit imposed by Mercury Regulatic R70-5.

3) Because of the breath of relief sought, an effort has been made to i vestigate mercury discharge from this entire plant. Despite the cooperation Petitioner in this effort, the investigation of areas other than the chlor-a operation is necessarily less than complete.

4) This facility has been visited by investigators from the Agency on several occassions. Numerous samples have been taken and analyzed for mercury content. These are tabulated at Exhibit A, attached. Representatives of the Agency have attended several conferences with Petitioner.

5) The filtration equipment described in the Petition has been installed and is operational. The Petitioner has indicated that past discharges from the chlor-alkali facility have contained mercury in concentrations of about 230 ppb at 200 gallons per minute. A recent sample of the final effluent from the filtering system indicated 54.0 ppb of mercury. At a meeting held June 22, 1971, Petitioner indicated that mercury discharges had been reduced from 7.0 pounds per day to about 0.7 pounds per day. It is evident that Petitioner has invested a great deal of money and effort in alleviating the problem of mercury discharge from its chlor-alkali process.

6) Numerous samples were taken from the Mississippi River both upstream and downstream of the outfall from the Sauget Sewage Treatment Plant through which Monsanto's effluent passes. Analysis of all such samples indicates Mercury in concentrations less than 0.5 ppb. Samples taken from the influent and effluent of that sewage treatment plant on June 24, 1971 show 12.5 ppb and 11.0 ppb of mercury respectively. However, it is impossible to attribute that mercury entirely to any one industrial source.

7) As constructed, the chlor-alkali mercury removal filtration system includes two 400,000 gallon holding tanks after the filters but before discharge into the sewers. The effluent can be tested at those tanks and discharged, if satisfactory, or recycled for further treatment, if necessary. Therefore, any order of the Board can be based upon the ability of this system to reduce concentrations of mercury, and need not provide for unusual peaks in mercury concentration, caused by accidents, breakdowns, spillage, etc.

8) It is theoretically possible to remove mercury from an effluent until the concentration is significantly less than 54 ppb. Some reasonable time probably is required for further development and installation. However, it is reasonable to require Petitioner to improve the quality of this effluent in less than a year. It is submitted that any variance granted should require further progress by the Petitioner over the course of the year.

9) Although Petitioner has made genuine progress in removing mercury from the effluent from its chlor-alkali facility, the same cannot be said of other parts of the plant on the basis of evidence provided by the petitioner to date. It is submitted that any variance granted should be limited to the chlor-alkali facility and should specifically exclude the remainder of this plant for four reasons:

a) The Petition complies with the requirements of Procedural Rule 401(a) only with regard to the chlor alkali facility.

b) As to all parts of the plant other than the chlor-alkali process, the petition does not allege substantive facts which would entitle Petitioner to a variance, even if true.

c) Analysis of samples taken indicates that some sections of the plant presently operate in compliance with R70-5. No variance is necessary as to these. (See Exhibit A, samples 2-N, 5-C, and 5-0-6.)

d) It is apparent that some sections of the plant do discharge mercury in very high concentrations. It may be possible to route these discharges through the filters, to lessen mercury contents by housekeeping improvements or process changes or to solve these problems in other ways. Petitioner should be required to explore these possibilities,

develop the best available solutions, and request variances as to other sections of the plant only if really necessary and only upon a more complete showing of facts.

10) Accordingly, it is recommended that a variance be granted, subject to the following conditions: a) the variance shall be limited to one year; b) the variance shall be limited to the chlor-alkali facility's effluent; c) the varianc shall not permit unlimited discharge of mercury, but shall specify an appropriate level of permissable discharge, as determined on the evidence presented at the hearing; d) the variance shall establish a schedule for further improvement of this effluent by requiring the effluent to meet specified, progressively lower levels of mercury concentration by specified dates a few months apart during the year of the variance; e) a suitable performance bond shall be posted; f) month reports shall be submitted to the Agency indicating rate of flow and levels of mercury concentrations in the discharge from the chlor-alkali facility and any changes in that facility which would effect amounts of mercury discharged.

The Agency reserves the right to amend this Recommendation at any time prior to the closing of the record in this matter.

Thomas W. Scheuneman, Manager
Division of Legal Services
Environmental Protection Agency

ILLINOIS POLLUTION CONTROL BOARD
October 31, 1972

MONSANTO COMPANY	)	
v.	)	PCB 72-336
ENVIRONMENTAL PROTECTION AGENCY	)	

OPINION AND ORDER OF THE BOARD (by Mr. Dumelle)

On August 10, 1972 the Monsanto Company (Monsanto) filed a petition requesting an extension for an additional year of their variance to discharge mercury in quantities greater than the regulation (PCB 71-110, November 8, 1971, 4 PCB 9) from the W. G. Krummrich Plant at Sauget.

Without a hearing we grant the variance for an additional year until November 7, 1973 for the reasons discussed below and subject to the conditions listed.

In our initial variance in this proceeding we set certain conditions upon Monsanto. The Agency, in a late filed recommendation received by us October 31, 1972 (the date of this decision) agrees that substantial compliance has been achieved with the original conditions. The only dispute appears over the amount of mercury to be permitted to be discharged. Monsanto asks to discharge "up to 0.5 lbs. of mercury per day as a daily average" (Petition).

The Agency in its recommendation mentions a Federal EPA "guideline" of 0.25 lbs. of mercury per day. No documentation of this "guideline" was submitted to the Board and we are unable to determine if in fact Monsanto agreed to meet this lower level of discharge.

Both Monsanto and the Agency point out that actual discharges for the six months ending July 1972 were 0.33 lbs. per day. Monsanto's recital of progress in reducing mercury discharges convinces us that the most recent discharge level (0.33 lbs. per day) can be met as an average based upon a six month moving average. The instant variance request asks that 0.5 lbs. per day

of mercury be permitted as a daily average. We shall permit this as a peak level not to be exceeded in any 24-hour period.

In January 1971 Monsanto was discharging 7.7 lbs. per day of mercury. They are now capable of meeting 0.33 lbs. per day for a most commendable reduction of 95.8% from the level of just 21 months ago.

Monsanto's petition states that 0.25 lbs. per day of mercury is lost from sources other than the chlor-alkali plant (which discharges 0.04 to 0.06 lbs. per day). We urge additional study of mercury contents in all raw materials used by Monsanto as well as attention to the removal of mercury deposits in the plant sewer system joints and cracks. And we again call attention to the mercury materials balance of the chlor-alkali plant which showed in 1971 an unexplained loss of 32,000 lbs. of this toxic metal that year. If these 16 tons of mercury are going to the Sauget atmosphere each year we should know that and limit that type of emission. If this mercury is going out of the Krummrich plant in the form of sodium hydroxide or potassium hydroxide or in the chlorine gas then we should also know that and prevent environmental contamination elsewhere by users of these products.

We will require a verification of the statements in the petition by an officer of Monsanto to be filed by December 11, 1972 with the Board and Agency.

The conditions listed in the order replace the conditions of the original variance and are patterned after them.

This opinion constitutes the Board's findings of fact and conclusions of law.

ORDER

1. Variance is granted until November 6, 1973 to permit discharge of mercury up to 0.33 lbs. per day based upon a 6-month moving average but not to exceed 0.5 lbs. in any 24-hour period.

2. Monsanto shall submit a verification of the petition executed by an officer to be filed with the Board and Agency by December 11, 1972.

3. Monsanto shall sample and analyze the mercury-bearing waste water which is alternately put in one of the two storage tanks prior to release to the village sewers and treatment plant. If the concentration of mercury is too high the wastes must be rerouted for further treatment.

4. Monsanto shall submit to the EPA monthly reports on the progress of its mercury abatement program. The reports shall include a listing of the mercury concentration of the waste water storage tanks before discharge and shall be submitted a reasonable time after the end of the month.

5. Monsanto shall submit to the Agency and the Board within six months from date a report listing the mercury materials balance for the chlor-alkali plant including the amounts which are emitted into the atmosphere and those which leave the plant contained in the products manufactured.

6. Failure to adhere to any of the conditions of this variance shall be ground for revocation of the variance.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 31st day of October, 1972 by a vote of 5-0.

Christan L. Moffett

Christan L. Moffett, Clerk
Illinois Pollution Control Board

Exhibit 71

Chicago, Illinois 60605
Chicago 312 939-1530
697-3785

December 30, 1975

RECEIVED IN THE OFFICE OF THE DIRECTOR
DEC 3 1975 3

Mr. Robert Schleuger
Illinois Environmental Protection Agency
Field Operations Director, Region IV
Division of Water Pollution Control
117 West Main
Collinsville, Illinois 62234

RE: Monsanto Chemical

Dear Mr. Schleuger:

I am concerned that inadequate reporting and monitoring procedures and requirements may be occuring with respect to the Monsanto Chemical Company's facility in Sauget, Illinois. As you know, polychlorinated bi-phenyls (PCB's) have been receiving attention in the news media over the past few weeks. Since the Monsanto plant produces a large percentage of PCB's manufactured in this country, I would be interested in being advised of the specific monitoring and permit conditions covering waste water discharges from this facility. Please direct your attention to the following questions:

1.) Are there any direct discharges from Monsanto-Sauget to any Illinois waterways?

2.) Has the level of PCB's in such discharge(s) been ascertained?

3.) If such discharge(s) exist, what permit conditions exist concerning PCB's?

4.) Has any testing by the IEPA of Monsanto discharges revealed the existence of PCB's? If so, when and how much PCB was shown to be present?

5.) Does Monsanto discharge waste products to any municipal sewage treatment plant? If so, please identify.

6.) Is there any monitoring of PCB's by Monsanto, the municipality or the EPA for wastewater entering and/or leaving the municipality? If so, when were such tests conducted and what were the results of such testing?

7.) Has the IEPA determined if PCB's are present in waters or sediments of any waterway downstream of the Monsanto-Sauget facility, at any time?

If necessary, please consider this a formal request for information and under the Freedom of Information Act (5 U.S.C. 552). I would appreciate your prompt attention to this request.

Sincerely,

Dennis A. Adamczyk

Dennis Adamczyk
Consultant

DA:cmc

cc: Jeff Diver
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

Illinois Environmental Protection Agency

Richard H. Buceland, Director

2200 Churchill Road Springfield, Illinois 62706

Telephone 618/345-622
Address Reply To
117 W. Main St
Collinsville, Ill. 62234

February 20, 1976

ST. CLAIR COUNTY - Monsanto Chemical Company
(Sauget)

RECEIVED
Field Operations Section
FEB 20 1976
Environmental Protection Agency
State of Illinois

Mr. Dennis Adamczyk, Consultant
Citizens For a Better Environment
59 East Van Buren, Suite 2610
Chicago, Illinois 60605

Dear Mr. Adamczyk:

This is in response to your letter dated December 30, 1975 to Regional Manager Robert L. Schleuger, regarding the discharge of polychlorinated bi-phenyls (PCB's) by the Monsanto Chemical Company's facility in Sauget, Illinois.

The following seven (7) items are answers to the questions raised in your letter:

1. To our knowledge, there are no direct discharges from the Monsanto facility located in Sauget, Illinois, into Illinois waterways.

2. The question is not relevant in light of the answer to question No. 1.

3. The question is not relevant.

4. Again, the question is not relevant.

5. Yes. All wastes discharged by the Monsanto facility is tributary to the Village of Sauget's waste treatment facility.

6. It is our understanding that the Monsanto Chemical Company routinely monitors their discharge of PCB's into the Village of Sauget's sewer system as well as the discharge of the Village's waste treatment works effluent into the Mississippi River. This Agency does not have information on their PCB monitoring, although reportedly it has been furnished to USEPA Region V Office.

   A sample collected on October 14, 1975 by staff of our Collinsville Regional Office showed 3.4 micrograms/liter of PCB's in the Village of Sauget's waste treatment works effluent. In addition, a joint sampling was conducted by IEPA and USEPA on January 27, 1976. Laboratory analysis of this sampling have not been completed at this time.

7. IEPA has not determined if PCB's are present in waters or sediments in downstream waterways from the Monsanto-Sauget facility.

You will be interested in knowing that the USEPA is in the process of addressing the issue of PCB's on a nationwide basis. You may want to contact the USEPA Region V Office in Chicago.

Very truly yours,

ENVIRONMENTAL PROTECTION AGENCY

Jeffrey R. Diver
Deputy Director

JRD/RLS/skv

cc: Director's Office
DWPC/FOS
DWPC/ESS
USEPA-Lee Townsend
Region IV

Exhibit 72

7 1976

Mr. R. W. Flint
Plant Manager
W. G. Krummrich Plant
Monsanto Industrial Chemicals Company
Sauget, Illinois 62201

Dear Mr. Flint:

As a follow-up to conversations between Mr. Clarence Buckley, Supervisory Environmental Control Engineer of Monsanto and Mr. Howard Zar of my staff on April 28th and April 29th, enclosed find a copy of the report prepared by U.S. EPA in regard to its January 27, 1976 wastewater inspection of the W. G. Krummrich Plant. An additional report, ("Assessment of Wastewater Management; Treatment Technology and Associated Costs for Abatement of PCB Concentrations in Industrial Effluents", Versar, Inc. Task II Final Report, February 3, 1976, EPA-560/6-76-006) relating to the Krummrich facility has already been received by Monsanto according to Mr. Buckley. The Versar report contains a lengthy discussion of PCB waste handling at your facility and available treatment methods.

On the basis of our reading of the Versar Task II report, it is our recommendation that concentrations of PCBs in Monsanto's effluent discharges to the Sauget Sewage Treatment Plant be reduced to the 1 ppb level. Present discharge of PCBs are appreciably higher, averaging in excess of [illegible] and rate in excess of 3 lbs/day (according to the Versar report).

We would appreciate your suggestions as to the proper way to resolve this matter as soon as you have had an opportunity to review these reports. A written response by May 17, 1976 would be appreciated. We would also like to schedule a meeting to discuss your response and also PCB air emissions at the facility, particularly from storage tanks. Please contact Mr. Zar or Mr. Fenner of my staff (312-353-1472) regarding the meeting and any questions that may arise.

Very truly yours,

Dale S. Bryson, Acting Director
Enforcement Division

Attachment

cc: Mr. Ronald Barganz, Illinois EPA

Exhibit 73

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST
CHICAGO ILLINOIS 60604

TO: Mary

① Barbara S.
Please advise others in the DIV. if this info request rule

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. John R. Eck, Managing Director
and Vice President
Monsanto Chemical Intermediates Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63166

JUN 6 1977

Re: Request Pursuant to Section 308(a) of the Federal Water Pollution Control Act, As Amended, 33 U.S.C. § 1318(a)

Dear Mr. Eck:

Present information available to the United States Environmental Protection Agency (U.S. EPA) indicates that the Monsanto Chemical Intermediates Company at its William G. Krummrich facility is the principal discharger of polychlorinated biphenyls (PCB's) as well as other potentially toxic, persistent chemicals into the Village of Sauget, Illinois, Wastewater Treatment Plant. Monsanto has stated its intention to cease all production of PCB's by August 31, 1977, and to cease distribution by October 31, 1977. It has further expressed on several occasions its willingness to participate voluntarily in an information-gathering process.

Therefore, in order to obtain data required to help improve water quality, the following request for information is made pursuant to authority provided by section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. § 1318:

1. Monsanto shall carry out the following monitoring program to determine what effect, if any, its PCB production and distribution elimination has on the PCB's discharged from Monsanto's facility. For a period of six months following receipt of this letter, Monsanto shall conduct the following PCB monitoring:

   A. Prior to PCB Production Shutdown (August 31, 1977):

Sampling Location	Frequency	Sample Type
(1) Monsanto Incinerator Discharge	1 x week	24-hour vertically Integrated Composite
(2) Monsanto Combined Discharge	1 x week	24-hour vertically Integrated Composite

B. Subsequent to PCB Production Shutdown:

Sampling Location	Frequency	Sample Type
(1) and (2) as stated in I.A.		
(3) Such other sampling as is needed to determine the existence of PCB contaminated sewers or runoff areas.		

II. Monsanto shall provide the following information on all products, byproducts and intermediates produced at the William G. Krummrich facility in 1976 and/or 1977, excluding bench scale and pilot plant production, by no later than 90 days after receipt of this letter:

A. 1. The names of any products, byproducts, or intermediates not present in Attachment A (information submitted in response to an inquiry from U.S. EPA's Effluent Guidelines Division in Washington, D.C.);

2. All chemical compounds incorrectly included in Attachment A;

3. For each product, byproduct, or intermediate, a list of all raw materials used in the production process, including but not limited to reactants, solvents, catalysts, emulsifiers, and stabilizers;

4. For each product, byproduct, or intermediate, a general description of the production process unless a correct description is already given in Attachment A;

B. For each production process, a listing of all chemical substances, other than those provided in II.A. above, which Monsanto has reason to believe might be present in the waste stream based on a thorough examination of all possible side reactions, feedstock impurities, and other potential contaminants;

C. All results of any previous chemical analyses for specific chemical compounds, performed on any waste stream. Exclude any information already submitted in response to the above-mentioned Effluent Guidelines Division inquiry;

D. The quantity of each chemical compound in Attachment B which is present in the final discharge from the plant, as determined by analysis of a vertically integrated, 24-hour composite sample collected during a period of normal operation;

C. For each product or intermediate in Attachment C, the quantity of product, feedstock, and any related byproducts and intermediates present in the individual process wastewater stream, as determined by analyzing a vertically-integrated, 24-hour composite sample collected following pretreatment but prior to mixing with any other waste streams.

Note: All chemical compounds shall be identified according to the IUPAC "Definitive Rules for the Nomenclature of Organic Chemistry" or equivalent standard chemical nomenclature. Abbreviations, trade names, and patent names are not sufficient.

III. Monsanto shall determine the physical integrity of the sewers within its control which carry production wastes from the Monsanto PCB production facility. The results shall be submitted no later than June 30, 1977.

IV. Monsanto shall also provide the following information with regard to PCB's:

A. Within 30 days of receipt of this letter, the total amount of PCB's currently being stored on site, the method and the location of storage;

B. Within 45 days of receipt of this letter, Monsanto's plan for the disposition of any PCB's not distributed after October 31, 1977; and

C. Within 45 days of receipt of this letter, a plan indicating the disposition of any PCB contaminated equipment and/or materials and/or the cleaning methods to be used to clean contaminated equipment. This includes on-site contamination and sewer contamination, as well as contaminated cleaning wastes.

V. A. The analytical and sampling methods used shall conform to 40 C.F.R. Part 136, 41 Federal Register 52780, dated December 1, 1976, which cites the following:

1. Standard Methods for the Examination of Water and Wastewater, 14th Edition, 1976, American Public Health Association, Washington, D.C. 20036.

2. A.S.T.M. Standards, Part 31, Water, 1975, American Society for Testing and Materials, Philadelphia, Pennsylvania 19103.

3. Methods for Chemical Analysis of Water and Wastes, 1974, U.S. Environmental Protection Agency, Office of Technology Transfer, Cincinnati, Ohio 45268.

Analytical procedures not covered in the above references can be obtained from the Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, Ohio 45268, (513) 684-7301. Different but equivalent methods are allowable if prior written approval from the U.S. EPA is obtained.

Monsanto shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation to insure accuracy of measurements.

B. Monsanto shall record for all samples the date and time of sampling, the sampling method used, the date analyses were performed, the identity of the particular method of analysis, and the results of all required analyses and measurements.

VI. The information requested herein must be provided notwithstanding its possible characterization as confidential or a trade secret. Should you so request, however, any information (other than effluent data, which by law must be made available to the public) which the Administrator of this Agency determines to constitute methods, processes, or other business information entitled to protection as a trade secret will be maintained as confidential, pursuant to the procedures specified in 40 C.F.R. Part 2 (41 Federal Register 36902, September 1, 1976). Please indicate clearly or submit separately any portion of the response you consider to be confidential or a trade secret, since any data not so identified will not be accorded this protection by the Agency.

VII. All reports and information required herein are to be submitted to the United States Environmental Protection Agency, Region V, Enforcement Division, Attention: Engineering Unit.

Very truly yours,

Dale S. Bryson

Dale S. Bryson, Acting Director
Enforcement Division

Attachments (3)

cc: Mr. [illegible]
Environmental Counsel
Monsanto Chemical Intermediates Company

Mr. Paul Sauget, Mayor
Village of Sauget, Illinois (w/o Attachments)

Exhibit 74

FINAL

1 1 1 9 0 1 0 1 5 (1-5)
(DO NOT USE)

FORM A: GENERAL FACILITY INFORMATION

Company Name: Ethyl Corporation
Division/Subsidiary
Facility Name: Edwin Cooper, Inc.

Address: Monsanto Avenue
No. Street

Sauget Illinois 62201
City State Zip Code

Name of Pr

Position:

Phone Numb

1. Year Facility Opened 19 7 1 (10-11)

2. Primary SIC Code 2 9 9 2 (12-15)

3. Estimate the total amounts of process wastes (excluding wastes sold for use) generated by this facility during 1978:
USE ONLY TONS IF POSSIBLE - right justify response

thousand gallons ..... (16-24)

hundred tons 1 2 4 (25-32)

thousand cubic yards ..... (33-41)

4. Estimate (in whole percents) how these process wastes generated in 1978 were disposed of:

in landfill 9 8 (42-44)

in pit/pond/lagoon ..... (45-47)

in deep well ..... (48-50)

incinerated 1 (51-53)

reprocessed/recycled 1 (54-56)

evaporated ..... (57-59)

unknown ..... (60-62)

other (Specify_____)..... (63-65)

5. What is the total number of known sites (including disposal on the property where this facility is located as one site) that have been used for the disposal of process wastes from this facility since 1950?..... 3 (66-68)

COMPLETE ONE FORM "B" FOR EACH OF THE SITE

6. Have any of the process wastes generated at this facility been hauled (removed) from this facility for disposal? (Yes=1; no=2) 1 (69)

IF YES, COMPLETE FORM "C"

7. Do you know the disposal site locations of all of the process waste hauled from your facility since 1950? (Yes=1; no=2) 1 (70)

IF NO, COMPLETE ONE FORM "D" FOR EACH FIRM OR CONTRACTOR WHO TOOK WASTE TO AN UNKNOWN LOCATION

8. Specify the earliest year represented by information from company or facility records supplied on this and other forms 19 7 8 (71-72)

9. Specify the earliest year represented by information from employee knowledge supplied on this and other forms 19 7 1 (73-74)

is less clear than this notice. It is due to the quality of the document

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								(1-8)
								(DO NOT USE)

Company Name: Ethyl Corporation
Division/Subsidiary:
Facility Name: Powin Cooper, Inc.

Site Name: Rollins Environmental Services

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>12	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	1	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	1	(24)*
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >10 pico curies/gram	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
insecticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	2	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	2	(42)
amides, amines, imides	2	(43)
plastizers	2	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	2	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	2	(52)
oils and oil sludges	1	(53)
esters and ethers	2	(54)
alcohols	2	(55)
ketones & aldehydes	2	(56)
dioxins	2	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc.	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_2, aluminum chloride)	2	(67)
wastes with flash point below 100° F	2	(68)

* Trace

FINAL

[2] [1] [2] [7] (1-8)
(DO NOT USE)

FORM B: DISPOSAL SITE INFORMATION

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: Ethyl Corporation Division/Subsidiary _____
Facility Name: Edwin Cooper, Inc.
Name of Site: Sauget and Co. Landfill
Address of Site: Monsanto Avenue
no. street
Sauget Illinois 62201
city state zip code

Name of Owner (while used by facility): Paul Sauget
Address: 2700 Monsanto Avenue
no. street
Sauget Illinois 62201
city state zip code

Current Owner (if different from above): _____
Address: _____
no. street
_____
city state zip code

1. Location (1= the property on which facility is located; 2= off-site)..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership 9=don't know) ..... [2] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [2] (12)
   IF CLOSED, specify year closed ..... 19[ ][ ] (13-14)
4. Year first used for process waste from this facility ..... 19[7][1] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7][9] (17-18)
6. Total amount of process waste from this facility disposed at site:
   USE TONS ONLY IF POSSIBLE: thousand gallons ..... [ ][ ][ ][ ][ ][ ][ ] (19-26)
   Right justify response hundred tons ..... [ ][ ][ ][ ][1][2][2] (27-33)
   thousand cubic yards ..... [ ][ ][ ][ ][ ][ ][ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)

landfill, mono industrial waste	[3]	(42)
landfill, mixed industrial waste	[1]	(43)
landfill, drummed waste	[9]	(44)
landfill, municipal refuse co-disposed ...	[9]	(45)
pits/ponds/lagoons	[3]	(46)
deep well injection	[3]	(47)
land farming	[3]	(48)
incineration	[3]	(49)
treatment (eg. neutralizing).....	[3]	(50)
reprocessing/recycling	[3]	(51)
other (specify) _____....	[3]	(52)

8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [3] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

Monsanto Company
Monsanto Avenue
Sauget, Illinois 62201

FORM B CONTINUED ON SECOND PAGE

[1] (80)

Page 2 of Page 2

Form

(1-3) (DO NOT USE)

Company Name: Ethyl Corporation
Division, or Subsidiary
Facility Name: Edwin Cooper, Inc.

Site Name: Sauget and Co. Landfill

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>12	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	1	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	1	(24) *
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >50pico curies/gram	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
insecticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	2	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	2	(42)
amides, amines, imides	2	(43)
plastizers	2	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	2	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	2	(52)
oils and oil sludges	1	(53)
esters and ethers	2	(54)
alcohols	2	(55)
ketones & aldehydes	2	(56)
dioxins	2	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc.	2	(61)
pharmaceutic l wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_2, aluminum chloride)	2	(67)
wastes with flash point below 100° F	2	(68)

* Trace amounts only

FINAL

[ ] (1-8)
(DO NOT USE)

FORM B: DISPOSAL SITE INFORMATION

COMPLETE THIS FORM FOR EVERY SITE (INCLUDING THE LOCATION OF THIS FACILITY AS ONE SITE) USED FOR THE DISPOSAL OF PROCESS WASTES GENERATED BY THIS FACILITY SINCE 1950.

Company Name: Ethyl Corporation Division/Subsidiary _____
Facility Name: Edwin Cooper, Inc.
Name of Site: Clayton Chemical Company
Address of Site: _____
no. street
Sauget Illinois 62201
city state zip code

Name of Owner (while used by facility): B. R. Haney
Address: _____
no. street
Sauget Illinois 62201
city state zip code

Current Owner (if different from above): _____
Address: _____
no. street
_____
city state zip code

1. Location (1= the property on which facility is located; 2= off-site) ..... [2] (10)
2. Ownership at time of use (1= company ownership; 2=private but not company ownership) 3=public ownership 9=don't know) ..... [2] (11)
3. Current status (1= closed; 2= still in use; 9=don't know) ..... [2] (12)
   IF CLOSED, specify year closed ..... 19[ ] (13-14)
4. Year first used for process waste from this facility ..... 19[7 1] (15-16)
5. Year last used for process waste from this facility (enter "79" if still in use) ..... 19[7 9] (17-18)
6. Total amount of process waste from this facility disposed at site:
   USE TONS ONLY IF POSSIBLE: Right justify response
   thousand gallons ..... [ ] (19-26)
   hundred tons ..... [ ] (27-33)
   thousand cubic yards ..... [ ] (34-41)
7. Specify type(s) of disposal method(s) used at site and whether method is still in use (1=currently in use; 2=no longer in use; 3=never used; 9=don't know)
   landfill, mono industrial waste ..... [3] (42)
   landfill, mixed industrial waste ..... [3] (43)
   landfill, drummed waste ..... [3] (44)
   landfill, municipal refuse co-disposed ... [3] (45)
   pits/ponds/lagoons ..... [3] (46)
   deep well injection ..... [3] (47)
   land farming ..... [3] (48)
   incineration ..... [9] (49)
   treatment (eg. neutralizing) ..... [3] (50)
   reprocessing/recycling ..... [1] (51)
   other (specify) _____ .... [3] (52)
8. Users of this site (1=this facility; 2=this facility and other company facilities only; 3=this company and others; 9=don't know) ..... [3] (53)

LIST NAMES AND ADDRESSES OF OTHER KNOWN USERS BELOW

[1] (80)

FORM B CONTINUED ON SECOND PAGE

Form B - Page 2 Rev. 0

(1-8)
(DO NOT USE)

Company Name: Ethyl Corporation
Division/Subsidiary:
Facility Name: Edwin Cooper, Inc.
Site Name: Clayton Chemical Company

9. Components (or characteristics) of process waste from this facility disposed at site: (1=present in waste; 2=not present in waste; 9=don't know)

FILL IN EVERY BLOCK SPACE

Acid solutions, with pH<3	2	(10)
pickling liquor	2	(11)
metal plating waste	2	(12)
circuit etchings	2	(13)
inorganic acid manufacture	2	(14)
organic acid manufacture	2	(15)
Base solutions, with pH>12	2	(16)
caustic soda manufacture	2	(17)
nylon and similar polymer generation	2	(18)
scrubber residual	2	(19)
Heavy metals & trace metals (bonded organically & inorganically)	1	(20)
arsenic, selenium, antimony	2	(21)
mercury	2	(22)
iron, manganese, magnesium	2	(23)
zinc, cadmium, copper, chromium (trivalent)	1	(24) *
chromium (hexavalent)	2	(25)
lead	2	(26)
Radioactive residues, >50pico curies/gram	2	(27)
uranium residuals & residuals for UF_6 recycling	2	(28)
lathanide series elements and rare earth salts	2	(29)
phosphate slag	2	(30)
thorium	2	(31)
radium	2	(32)
other alpha, beta & gamma emitters	2	(33)
Organics	1	(34)
insecticides & intermediates	2	(35)
herbicides & intermediates	2	(36)
fungicides & intermediates	2	(37)
rodenticides & intermediates	2	(38)
halogenated aliphatics	2	(39)
halogenated aromatics	2	(40)
acrylates & latex emulsions	2	(41)
PCB/PBB's	2	(42)
amides, amines, imides	2	(43)
plastizers	2	(44)
resins	2	(45)
elastomers	2	(46)
solvents polar (except water)	2	(47)
carbontetrachloride	2	(48)
trichloroethylene	2	(49)
other solvents nonpolar	2	(50)
solvents halogenated aliphatic	2	(51)
solvents halogenated aromatic	2	(52)
oils and oil sludges	1	(53)
esters and ethers	2	(54)
alcohols	1	(55)
ketones & aldehydes	2	(56)
dioxins	2	(57)
Inorganics	2	(58)
salts	2	(59)
mercaptans	2	(60)
Misc.	2	(61)
pharmaceutical wastes	2	(62)
paints & pigments	2	(63)
catalysts (eg. vanadium, platinum, palladium)	2	(64)
asbestos	2	(65)
shock sensitive wastes (eg. nitrated toluenes)	2	(66)
air water reactive wastes (eg. P_2, aluminum chloride)	2	(67)
wastes with flash point below 100° F	2	(68)

* Trace

FINAL

4/8/0/0/5/ (1-5)
(DO NOT USE)

FORM C: HAULER INFORMATION

PROVIDE A COMPLETE LIST OF ALL FIRMS AND INDEPENDENT CONTRACTORS, INCLUDING THE COMPANY AND ITS AFFILIATES AND SUBSIDIARIES, USED TO REMOVE PROCESS WASTES FROM THIS FACILITY SINCE 1950.

Company Name: Ethyl Corporation
Division/Subsidiary
Facility Name: Edwin Cooper, Inc.

Name of Firm or Contractor	Address	ICC # (If Known)	Years Used
Hueffmeier Bros.	11506 Bowling Green Dr. St. Louis, MO 63141		2
Empire Disposal	8923 Bunkum Road Fairview Hqts., ILL 62208		7
Bliss Waste Oil Co.	P. O. Box 37 Streeker Rd. Ellisville, MO 63011		9
Harold Waggoner & Co.	E. St. Louis, Ill 62206		1
ABF Freight System	8630 Hall St. St. Louis, MO		2

To File

RECEIVED

Dec 21 '79

I.E.P.A. [illegible] D.C.
PERMIT [illegible]
COMPLIANCE MGT UNIT

Peter Garvin
11812 Grandview
Wheaton, Maryland 20902

December 17, 1979

Mr. Mark Schollenberger
Illinois Environmental
Protection Agency
Water Pollution Division
Springfield, Illinois

RE: Connecticut Permits for the Monsanto Grumrich Plant in Sauget, Illinois

Dear Mr. Schollenberger:

As we discussed over the telephone last week, I am interested in obtaining copies of all connection permits and connection permit applications for the "Monsanto Grumrich Plant" in Sauget, Illinois. I would appreciate it if you would forward copies of connection permit applications and connection permits now on file and also of all such permit applications and permits filed for the plant by its new owner, the Edwin Cooper Division of Ethyl Corporation.

I will be happy to pay the costs of locating, duplicating and mailing these materials. Please let me know if you have any questions concerning this request. I appreciate your cooperation in these matters.

Very truly yours,

Peter Garvin

Peter Garvin

1 4 2 6 0 0 0 1 1 6 5

[illegible] 299A
ETHYL CORPORATION
[illegible] 4TH ST
[illegible] VA [illegible]

[illegible] GOTTWALD
CHIEF EXECUTIVE

AMERICAN BOTTOMS
REGIONAL WASTEWATER TREATMENT FACILITY
1 AMERICAN BOTTOMS ROAD
SAUGET, ILLINOIS 62201
(618) 337-1710
FAX (618) 337-6619

VILLAGE OF SAUGET

AMERICAN BOTTOMS REGIONAL WASTEWATER TREATMENT FACILITY

WASTEWATER DISCHARGE PERMIT

for

Ethyl Petroleum Additives

PERMIT NO. 92-102

Ethyl Petroleum Additives
Log # 2521-93
Permit No. 1993-EW-2324

REVISED: November 16, 1992

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AMERICAN BOTTOMS
REGIONAL WASTEWATER TREATMENT FACILITY
1 AMERICAN BOTTOMS ROAD
SAUGET, ILLINOIS 62201
(618) 337-1710
FAX (618) 337-8919

Ethyl Petroleum Additives
Monsanto Avenue
Sauget, Illinois 62201

Wastewater Discharge Permit No. 92-102
Revised and reissued effective December 1, 1992.

Dear Sirs:

In accordance with all the terms and conditions of Ordinance 632 of the Village of Sauget; the 1977 Regional Agreement as amended; Section 46 of the Illinois Environmental Protection Act of 1970 (Ill. Rev. Stat. 1987. Ch. 1111/2, Sec. 1046) as amended; and Ill. Rev. Stat. 1987, Ch 24, Sec. 11-141-7; permission is hereby granted to Ethyl Petroleum Additives, operating under the Standard Industrial Classification (SIC) Code 2869, and subject to the National Categorical Pretreatment Standard (NCPS) No. 40 CFR 414, Subpart G, to discharge industrial wastewater into sewer lines tributary to the American Bottoms Regional Wastewater Treatment Plant in accordance with and subject to the provisions of attached American Bottoms Regional Wastewater Discharge Permit No. 92-102 ("Permit").

This Permit is granted in response to the application filed on February 10, 1992 in the office of the General Manager, #1 American Bottoms Road, Sauget, Illinois 62201, and in conformity with plans, specifications and other data submitted in support of the above application, all of which are filed with and considered as a part of this Permit, together with the attached conditions and requirements.

Nothing herein shall be construed as a permit or as permission for the permittee to violate the provisions of any sewer use ordinance in effect within the jurisdiction of any unit of local government in which the permittee's facility is located.

This Revised Permit will take effect on December 1, 1992, and will expire on August 1, 1994.

VILLAGE OF SAUGET

By: George R. Schilling
General Manager

RECEIVED 2521-93

JAN 14 1993

Environmental Protection Agency
WPC -- Permit Log In

PART 1 - GENERAL CONDITIONS OF PERMIT

A. General - This Wastewater Discharge Permit shall be expressly subject to all provisions of Ordinance 632 of the Village of Sauget (hereinafter "the Ordinance") and all other applicable regulations, user charges,and fees established by the Village of Sauget. In consideration of the granting of this Permit, the permittee shall comply with all provisions of the Ordinance, Permit conditions, and the Implementation procedures including, but not limited to the specific requirements of these General Condition Articles. Any Permit noncompliance constitutes a violation of the Ordinance, and is grounds for enforcement action.

B. Prohibitive Standards - The permittee shall comply with all prohibitive discharge standards pursuant to Section 3.2 of the Ordinance and all Local, State, and Federal discharge limits set forth in the Permit.

C. Prohibition of Improper Dilution - Improper dilution shall be prohibited pursuant to Section 3.6 of the Ordinance.

D. Duration - This Permit is issued effective December 1, 1992, and shall expire on August 1, 1994.

E. Transfer - Pursuant to Section 4.11 of the Ordinance, this Wastewater Discharge Permit may be reassigned or transferred, in whole or in part, to a new owner and/or operator only if the permittee gives at least thirty (30) days advance notice to the POTW and the POTW approves the Wastewater Discharge Permit transfer. The notice to the POTW must include a written certification by the new owner and/or operator which:

1. States that the new owner and/or operator has no immediate intent to change the facility's operations and processes;

2. Identifies the specific date on which the transfer is to occur; and

3. Acknowledges full responsibility for complying with the Wastewater Discharge Permit.

F. Change in Conditions - Pursuant to Section 4.7 of the Ordinance, in the event the type, quality, character or volume of Pollutants in a Discharge, including the listed or characteristic hazardous wastes for which the permittee has

submitted initial notification under Section 4.13.5 of the Ordinance, is expected to substantially change as reasonably determined by the permittee or POTW, the permittee or his assignee (see paragraph E. above) shall give sixty (60) days advance notice in writing to the POTW and shall make a new application to the POTW and the Sewer System Owner prior to said change. No permittee shall substantially change the type, quality, character or volume of its Wastewater beyond that allowed by this Permit without prior approval of the Sewer System Owner and the POTW.

G. Access - Pursuant to Section 4.15 of the Ordinance, persons or occupants of premises in which a Discharge source or treatment system is located or in which records are kept shall allow the POTW or its representative ready access upon presentation of credentials at reasonable times to all parts of said premises for the purposes of inspection, sampling, examination and photocopying of records required to be kept by the Ordinance and this Permit, and in the performance of any of their duties. The POTW shall have the right to set up on the permittee's property such devices as are necessary to conduct sampling, monitoring and metering operations.

H. Retention of Records - Pursuant to Section 4.15 of the Ordinance, the permittee shall maintain records of all information resulting from any monitoring activities required by this Ordinance and shall include:

1. The date, exact place, method and time of sampling and the names of the Person or Persons taking the samples;

2. The dates analyses were performed;

3. Who performed the analyses;

4. The analytical techniques/methods used; and

5. The results of such analyses.

The permittee shall maintain for inspection by the POTW, IEPA or USEPA such records for a minimum of three (3) years. This period of retention shall be extended during the course of any unresolved litigation regarding the Discharge of Pollutants by the permittee or operation of the POTW Pretreatment program or when requested by the Regional Administrator of USEPA or the Director of IEPA.

I. Analytical Methods - All measurements, sampling, tests, and analyses to which reference is made in this Permit shall be determined and performed in accordance with the procedures established by the Administrator of the United States Environmental Protection Agency (hereafter "Administrator") pursuant to Section 304(g) of the Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedures approved by the Administrator. Sampling shall be performed in accordance with the techniques approved by the Administrator. Where 40 CFR Part 136 does not include sampling or analytical techniques for the Pollutants in question, or where the Administrator determines that the Part 136 sampling and analytical techniques are inappropriate for the Pollutant in question, sampling and analyses shall be performed using validated analytical methods or any other sampling and analytical procedures, including procedures suggested by the POTW or other parties, approved by the Administrator.

J. Pretreatment Facilities - The permittee shall provide necessary Wastewater Pretreatment as required to comply with the Ordinance and shall achieve compliance with all applicable Pretreatment Requirements and Standards within the time limitations as specified by appropriate statutes, regulations, and the Ordinance. Any facilities required to pretreat Wastewater to a level acceptable to the POTW shall be provided, properly operated and maintained at the permittee's expense. Such Pretreatment facilities shall be under the control and direction of an IEPA certified Wastewater Treatment Operator.

K. Spill Containment - Pursuant to Section 3.7 of the Ordinance, any permittee having the ability to cause Interference or Pass-Through of the POTW or to violate the regulatory provisions of the Ordinance shall provide protection from Accidental or Slug Discharges to the POTW of prohibited materials or other substances regulated by the Ordinance. Any facilities required to prevent Accidental or Slug Discharge of prohibited materials shall be provided and maintained at the permittee's own cost and expense.

L. Permit Modifications - The terms and conditions of this Permit may be modified by the POTW during the term of the Permit for good cause including, but not limited to, the following: to incorporate any new or revised Federal, State, or local Pretreatment Standards or Requirements; to address significant alterations or additions to the permittee's operation, processes, or Wastewater volume or charac-

ter since the time of Wastewater Discharge Permit issuance; a change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized Discharge; misrepresentation or failure to fully disclose all relevant facts in the Wastewater Discharge Permit application or in any required reporting; revision of or a grant of variance from Categorical Pretreatment Standards pursuant to 40 CFR 403.13; to correct typographical errors in the Wastewater Discharge Permit; or to reflect a transfer of the facility ownership and/or operation to a new owner/operator (as provided in paragraph E. above). The permittee shall be informed of any proposed changes in its Permit at least 30 days prior to the effective date of any modification.

M. Civil and Criminal Penalties - Pursuant to Part 6 of the Ordinance, any permittee who is found to have violated an Order of the POTW or who has failed to comply with any provision of the Ordinance, and the orders, rules, and regulations and Wastewater Discharge Permits issued thereunder, may be fined by appropriate suit at law in an amount not less than one hundred dollars ($100) nor more than one thousand dollars ($1000) per day for each violation. In addition to the penalties provided herein, the POTW may recover reasonable attorney's fees, court costs, court reporter fees and other expenses of litigation by appropriate suit at law against the Person found to have violated this Ordinance or the orders, rules, regulations and Permits issued thereunder.

Any Person who knowingly makes any false statements, representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to the Ordinance or Wastewater Discharge Permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under the Ordinance, shall in addition be guilty of a misdemeanor and upon conviction, be punished by a fine of $500 to $1,000, for each offense.

N. Additional Information - The permittee shall furnish any additional information as may be reasonably requested by the Village of Sauget from time to time.

O. Upset - Pursuant to Section 3.8 of the Ordinance, the permittee shall have an affirmative defense to an action brought for noncompliance with National Categorical Pretreatment Standards provided that the conditions of Section 3.8.3 of the Ordinance are met. In any enforcement proceed-

ing, the permittee seeking to establish the occurrence of an Upset shall have the burden of proof.

P. Bypass - Bypass provisions pursuant to Section 3.9 of the Ordinance are applicable to this Permit and are hereby incorporated by reference.

Q. Resampling - Pursuant to Section 4.13.3.7 of the Ordinance, if sampling performed by the permittee indicates a violation, the permittee shall notify the POTW within 24 hours of becoming aware of the violation. The permittee shall also repeat the sampling and analysis and submit the results of the repeat analysis to the POTW within 30 days after becoming aware of the violation, except the permittee is not required to resample if:

1. The POTW performs sampling at the permittee at a frequency of at least once per month, or

2. The POTW performs sampling at the permittee between the time when the permittee performs its initial sampling and the time when the permittee receives the results of this sampling.

Resampling is only required for those parameters for which the violation has been identified.

R. Notifications - The following verbal and written notifications are required:

1. Pursuant to Section 4.13.3.7 of the Ordinance, if sampling performed by the permittee indicates a violation of any requirements of the Ordinance or this Permit, the permittee shall notify the POTW within 24 hours of becoming aware of the violation. Such notification may be made orally by telephone.

2. Pursuant to Section 3.7.4 of the Ordinance, in the case of an Accidental or Slug Discharge of Pollutants which may cause Interference at the POTW or may Pass Through the POTW or violate any other requirements of the Ordinance or this Permit, it shall be the responsibility of the permittee to immediately telephone and notify the POTW and the Sewer System Owner of the incident. The notification shall include name of caller, location and time of Discharge, type of Wastewater, estimated concentration and volume. For permittees discharging to the P-Chem Plant, notice to the POTW only is required.

3. Within five days following an Accidental Discharge, the permittee shall submit to the POTW and the Sewer System Owner a detailed written report describing the cause of the Accidental Discharge and the measures to be taken by the permittee to prevent similar future occurrences.

4. A permittee wishing to establish the affirmative defense of Upset for noncompliance with National Categorical Pretreatment Standards shall, in addition to the 24-hour verbal notification required in 1. above, and under Section 3.8.3.3 of the Ordinance, provide a written submission containing the information required by Section 3.8.3.3 of the Ordinance within five days of becoming aware of the Upset.

5. Pursuant to Section 3.9.2.1 of the Ordinance, if the permittee knows in advance of the need for a Bypass, it shall submit prior written notice to the POTW, if possible at least ten days before the date of the Bypass.

6. Pursuant to Section 3.9.2.2 of the Ordinance, the permittee shall submit oral notice of an unanticipated Bypass that exceeds applicable Pretreatment Standards or Requirements to the POTW within 24 hours from the time the permittee becomes aware of the Bypass. A written submission meeting the requirements of Section 3.9.2.2 of the Ordinance shall also be provided to the POTW within 5 days of the time the permittee becomes aware of the Bypass.

7. Pursuant to Section 4.13.5.3 of the Ordinance, in the case of any new regulations under Section 3001 of RCRA identifying additional characteristics of hazardous waste or listing any additional substance as a hazardous waste, the permittee must notify the POTW, the EPA Regional Waste Management Division Director, and the State hazardous waste authorities of the Discharge of such substance within 90 days of the effective date of such regulations.

S. <u>Report Submittal</u> - All reports and/or notifications required by this Permit shall be submitted to:

American Bottoms Regional Wastewater Treatment Facility
#1 American Bottoms Road
Sauget, Illinois 62201
Attn: Pretreatment Coordinator

Telephone: (618) 337-1710
Facsimile: (618) 337-8919

PART 2 - GENERAL AND SPECIFIC REPORTING REQUIREMENTS

A. General - The General Pretreatment Regulations of 40 CFR 403.12 and Ordinance 632 have set forth basic reporting requirements that apply to the permittee.

B. Specific - The specific reporting requirements of this Permit include the following reporting requirements:

1. Monitoring Reports - Monitoring results obtained shall be summarized and reported on a monthly basis. The report is due on or before 45 days after the end of the month in which the sampling was performed. The report shall indicate the nature and concentration of all pollutants in the wastewater discharges which are regulated by the standards set forth in this Permit and include measured maximum and average daily flows. These reports will satisfy the requirement for the Periodic Compliance Report, provided they contain all the information and certifications required pursuant to Section 4.13.3 of the Ordinance.

PART 3 - GENERAL SAMPLING AND TESTING REQUIREMENTS

A. The permittee is responsible for compliance sampling. The monitoring facilities designated by this Permit are shown on Figure 1.

B. Compliance monitoring results and frequencies may be reviewed annually by the Village of Sauget and appropriate adjustments made to frequencies and parameters in a modified or revised Wastewater Discharge Permit.

C. All handling and preservation of collected samples and laboratory analyses shall be performed in accordance with procedures contained in 40 CFR Part 136 and amendments thereto unless specified otherwise in the monitoring conditions of this Permit. Composite sampling, where called for, shall be performed over a twenty-four (24) hour period by flow or time proportionate methods.

The test procedures for all samples shall conform to one of the USEPA approved test methods which provides the most sensitive detection limits for the pollutant under investigation listed in the current issue of the Code of Federal Regulations, and the most recent addendum published by the Federal Register. The testing for priority organic pollut-

ants shall be conducted utilizing gas chromatograph/mass spectrometer (GC/MS) methods and procedures. Other test procedures may be approved by the USEPA, pursuant to Section 4.15.2 of the Ordinance.

D. The appropriate flow measurement devices and methods consistent with approved scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes.

E. For each measurement or sample taken pursuant to the requirements of this Permit, the permittee shall maintain and submit records which include:

1. The date, exact place, method and time of sampling;
2. The names of the person or persons taking the samples;
3. The dates analyses were performed;
4. Who performed the analyses;
5. The analytical techniques/methods used;
6. The results of such analyses; and
7. The average daily and maximum daily flows.

F. In the event of a sampling failure, including, but not limited to, failure of sampling equipment, or sample damage, contamination, or breakage, sampling shall be repeated as soon as possible at all applicable required monitoring locations for those parameters for which the analysis of the original sample(s) was intended.

G. The 30 day resampling requirement of Part I.Q. of this Permit shall apply to all monitoring locations identified in this Permit. Where a violation of a plant mass limitation has occurred, all sites which contribute to the calculation of the plant mass shall be resampled concurrently. Only those parameters for which the violation has been identified are required to be analyzed as part of the resampling.

H. Where agreed upon in advance by both parties, the POTW may perform monitoring and testing for a parameter(s) regulated by this permit and such POTW monitoring shall satisfy the self-monitoring requirement for the subject parameter(s).

PART 4 - EFFLUENT LIMITATIONS, SAMPLING AND TESTING REQUIREMENTS

A. Local Limits: The Village of Sauget reserves the right, in Ordinance 632, to establish limitations or requirements on discharges to the wastewater disposal system if deemed necessary to comply with the objectives presented in Sectic 1.4 of the Ordinance.

Parameter	Limitations
Ammonia nitrogen	50 mg/l (24-hour composite) 75 mg/l (grab)

B. State Limits: These limits are stated in 35 Ill. Adm. Code Part 307. This Part 307 places restrictions on the types, concentrations, and quantities of contaminants which can be discharged into sewer systems in the State.

Limitations:

Parameters	Monthly Average (mg/l)	Daily Composite (mg/l)	Grab sample (mg/l)
Mercury	0.003	0.006	0.015
Cyanide (Total)	--	--	10.0

Any sample tested shall not release more than 2 mg/l of cyanide when tested at a pH of 4.5 and at a temperature of 66°C (150°F) for a period of 30 minutes.

The mercury limitation shown is the alternate limitation based on 35 Illinois Adm. Code 307.1102(c). Subject to the averaging rule of Ill Adm. Code 304.104, the monthly average shall be the numerical average of all daily composites taken during a calendar month. A monthly average must be based on at least three daily composites.

C. National Categorical Pretreatment Standards (NCPS): Ethyl Petroleum Additives operations are subject to 40 CFR 414, Subpart G, which has a final compliance date for Pretreatment Standards for Existing Sources (PSES) of November 5, 1990. Sources must comply with 40 CFR Part 403 and achieve discharges not exceeding mass limits determined from the

concentrations listed in the regulation. The limits are identified as follows:

NCPS - 40 CFR 414	Regulatory Concentration Reference Values (PPB)		Plant Mass Limits (lbs/day)	
Parameter	Max. One Day	Max. Mo. Avg.	Max. One Day	Max. Mo. Avg.
1,1,1-Trichloroethane	59	22	0.26	0.097
1,1,2-Trichloroethane	127	32	0.562	0.14
1,1-Dichloroethane	59	22	0.26	0.097
1,1-Dichloroethene	60	22	0.27	0.097
1,2,4-Trichlorobenzene	794	196	3.51	0.867
1,2-Dichlorobenzene	794	196	3.51	0.867
1,2-Dichloroethane	574	180	2.54	0.797
1,2-Dichloropropane	794	196	3.51	0.867
1,2-trans-Dichloroethene	66	25	0.29	0.11
1,3-Dichlorobenzene	380	142	1.68	0.628
1,3-Dichloropropene	794	196	3.51	0.867
1,4-Dichlorobenzene	380	142	1.68	0.628
2-Nitrophenol	231	65	1.02	0.29
4,6-Dinitro-o-cresol	277	78	1.23	0.35
4-Nitrophenol	576	162	2.55	0.717
Benzene	134	57	0.593	0.25
Carbon Tetrachloride	380	142	1.68	0.628
Chlorobenzene	380	142	1.68	0.628
Chloroethane	295	110	1.31	0.487
Chloroform	325	111	1.44	0.491
Ethylbenzene	380	142	1.68	0.628
Hexachlorethane	794	196	3.51	0.867
Hexachlorobenzene	794	196	3.51	0.867
Hexachlorobutadiene	380	142	1.68	0.628
Methyl Chloride	295	110	1.31	0.487
Methylene Chloride	170	36	0.752	0.16
Nitrobenzene	6402	2237	28.33	9.900
Tetrachloroethene	164	52	0.726	0.23
Toluene	74	28	0.33	0.12
Trichloroethylene	69	26	0.31	0.12
Vinyl Chloride	172	97	0.761	0.43
Total Lead	690	320	N/A	N/A
Total Zinc	2610	1050	N/A	N/A

The Regulatory Concentration Reference Values are included in this permit for reference purposes only. An exceedance of a Regulatory Concentration Value, without an exceedance of the corresponding mass limit, shall not be deemed a violation of this permit.

Mass limits are based on an average daily process flow of 530,618 gallons per day. Mass limits are subject to change based on changes in process flows. The regulated facility shall notify POTW in writing at least sixty (60) days prior to any proposed material and/or substantial changes in process flows to allow for the calculation of revised limits.

Cyanide, lead, and zinc are not regulated at Ethyl due to the absence of cyanide and metal bearing waste streams as listed in 40 CFR 414.

D. Monitoring Schedule

1. The monitoring schedule requirements are required as of the effective date of this Permit.

2. Monitoring locations are indicated in the attached diagram, Figure 1.

3. Monitoring frequencies:

Parameter (Units)	Monitoring Location	Monitoring Frequency	Sample Type
Ammonia nitrogen (mg/L)	A	See 4. below	Composite
Mercury (mg/L)	A	Once/month	Composite
Cyanide (mg/L)	A	Once/month	Grab
Flow (mgd)	A	Daily	Meter

OCPSF Parameters (lbs/day)	Monitoring Location	Monitoring Frequency	Sample Type
1,1,1-Trichloroethane	A	1/week	grab
1,1,2-Trichloroethane	A	1/week	grab
1,1-Dichloroethane	A	1/week	grab
1,1-Dichloroethene	A	1/week	grab
1,2,4-Trichlorobenzene	A	1/week	comp.
1,2-Dichlorobenzene	A	1/week	comp.
1,2-Dichloroethane	A	1/week	grab
1,2-Dichloropropane	A	1/week	grab
1,2-trans-Dichloroethene	A	1/week	grab
1,3-Dichlorobenzene	A	1/week	comp.
1,3-Dichloropropene	A	1/week	grab
1,4-Dichlorobenzene	A	1/week	comp.
2-Nitrophenol	A	1/week	comp.

OCPSF Parameters (lbs/day)	Monitoring Location	Monitoring Frequency	Sample Type
4,6-Dinitro-o-cresol	A	1/week	comp.
4-Nitrophenol	A	1/week	comp.
Benzene	A	1/week	grab
Carbon Tetrachloride	A	1/week	grab
Chlorobenzene	A	1/week	grab
Chloroethane	A	1/week	grab
Chloroform	A	1/week	grab
Ethylbenzene	A	1/week	grab
Hexachloroethane	A	1/week	comp.
Hexachlorobenzene	A	1/week	comp.
Hexachlorobutadiene	A	1/week	comp.
Methyl Chloride	A	1/week	grab
Methylene Chloride	A	1/week	grab
Nitrobenzene	A	1/week	comp.
Tetrachloroethene	A	1/week	grab
Toluene	A	1/week	grab
Trichloroethylene	A	1/week	grab
Vinyl Chloride	A	1/week	grab

4. Compliance with the ammonia nitrogen local limit will be determined by sampling and testing performed by the POTW. Permittee self-monitoring for ammonia is not required.

PART 5 - COMPLIANCE SCHEDULE

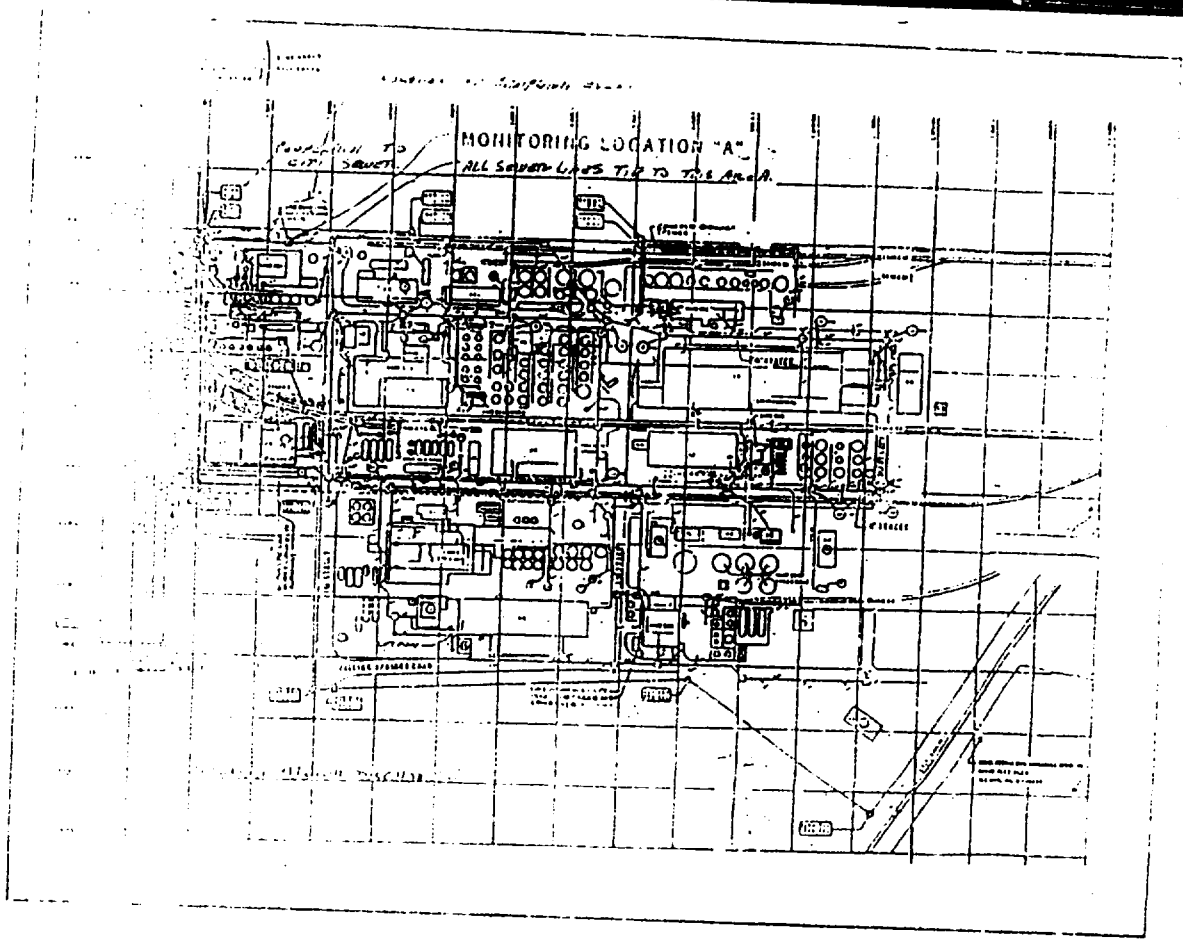
A. General:

Authority Citation: Section 4.13 Village of Sauget Pre-treatment Ordinance No. 632.

Permit No. 92-102

Industry Name: Ethyl Petroleum Additives

B. Final Compliance Date: 40 CFR 414 - November 5, 1990



MONITORING LOCATION PLAN
ETHYL PETROLEUM ADDITIVES, INC.

Exhibit 75

COPY

B. C. McCURDY
Licensed Structural Engineer
BELLEVILLE, ILL.

Nov. 2, 1932.

Mr. H. P. Ferguson,
Chief Sanitary Engineer
Sanitary Water Board
Springfield, Ill.

My dear Sir:-

I am enclosing, under separate cover, a complete set of plans, specifications and proposal forms for the construction of a System of Sewers in the Village of Monsanto, Illinois, for your inspection and approval.

I have been informed by the U.S.Engineer's Office in St. Louis that no permit will be necessary since we do not contemplate an improvement extending beyond the landward harbor line of the Mississippi River. They have suggested, however, that we submit the matter to them and they will write a letter stating that no permit is needed.

In general, the plans submitted have been the result of a very careful study participated in by the Engineers for the large industrial interests and meets their approval. The outlet has been placed down stream from the intake of the Union Electric Light & Power Company's Cahokia generator Station. There is no water intake to my knowledge, for many miles downstream. The East St. Louis Sewage is discharged into the stream about a half mile northward of our outfall. In general sewer velocities have been kept up to 2.5 feet per second, except in the ends of two laterals where it has been permitted to drop 20 feet per second. This relatively high minimum velocity has been used to carry off any infiltration of sand or precipitations in the flow.

Your comments would be appreciated, and as the Village wishes to proceed rapidly, due to unusual low stages of the Mississippi River, I am sure that all concerned will appreciate your expediting this matter.

Yours truly,

B. C. McCurdy
Village Engineer

BCMcC/RR

xxxxxxxxxxx Frank J. Jirka, E.D.

X xxxxxxxxxxx W. W. McLaughlin

MONSANTO-Sewerage
Permit 1933-8

February 11, 1933

Village of Monsanto
St. Clair County
Monsanto, Illinois

Permit is hereby granted to the Village of Monsanto, St. Clair, County, to construct and maintain a system of sanitary and industrial waste sewer with pumping station and outlet to Mississippi River in accordance with plans and specifications submitted by S. C. McCurdy, village engineer, acting as your agent, said plans, specifications [illegible] hereof.

This permit is issued subject to the following conditions:

1. This authority is granted in accordance with the provisions of an act entitled "An act to establish a Sanitary Water Board and to control, prevent and abate pollution of the streams, lakes, ponds, and other surface and under-ground streams in this state", approved June 28, 1929; in force July 1, 1929, and subject to the provisions thereof.

2. This authority shall not be considered as in any manner affecting the title to the premises upon which the sewerage works in question are to be located.

3. This authority does not in any way release the permittee from any liability for damage to person or property caused by or resulting from the installation, maintenance or operation of the sewerage system, located and constructed in accordance with the plans and specifications herein referred to.

4. The Sanitary Water Board in issuing this permit has relied upon the statements and representations made by the permittee in the application hereof and in case any statement or representation in said application is found to be incorrect this permit may be revoked without further notice and the permittee thereupon waives all rights thereunder.

5. There shall be no deviations from the plans and specifications submitted with the application for this permit unless revised plans and specifications therefore shall first have been submitted to the Sanitary Water Board and a supplemental written permit issued therefor.

6. The Sanitary Water Board or any person duly authorized by it may, at any time during the progress of the construction or the installation of the sewerage system or any part thereof under authority hereof, have the right and authority to inspect such work during the progress thereof, and such Board or its duly authorized agent shall have the authority at any and all times after the erection or the installation of such sewerage system to inspect the same or the operation thereof.

7. A combined sewage and industrial waste treatment works or separate treatment works will be installed in the future if and when experience or conditions in the opinion of the Sanitary Water Board shows that such are necessary in order to abate or prevent objectionable pollution of Mississippi River.

SANITARY WATER BOARD

By _____
Technical Secretary

And _____
Director of Public Health

HFY-dw

Copy to: Mr. B. O. McCurdy
Village Engineer
Belleville, Illinois.

Exhibit 76

Subject: MONSANTO—Sewerage
Review of plans

November 28, 1932.

Mr. R. C. McCurdy,
Consulting Engineer,
Belleville, Illinois.

Dear Mr. McCurdy:

We have reviewed your plans of the proposed sewer system for the village of Monsanto and have the following comments:

1. In reviewing the plans we have assumed that only the industrial wastes mentioned in your letter of November 23 and domestic sewage from the village and no storm or surface water is to be carried by the sewers. Please advise us if this assumption is not correct.

2. On the general plan of the system on Sheet 1, Section A is shown as a 36-inch sewer and in the profile on Sheet 2 it is shown as a 30-inch sewer at a 0.1% grade. According to our figures even if the diameter was intended as 36-inch the capacity of the sewer at the grade shown in the profile is about 21 second feet or about 13.6 M.G.D. Since the maximum industrial flow indicated in your letter of November 23 is about 18 M.G.D. it would appear that Section A would be somewhat under capacity unless this line is intended to be surcharged during maximum flow.

3. At what points in the system are wastes from the Monsanto Chemical Works discharged? The approximate volume discharged at each point is also necessary for our complete analysis of the system.

4. What is the high water elevation of Mississippi River at the proposed outlet?

5. Before issuing a permit for this improvement we ask that a statement be submitted by a responsible official of each company planning to discharge industrial wastes to this proposed system reporting the composition, character, and variation in strength of the wastes which will be discharged.

Very truly yours,

WHB-dp

Technical Secretary.

Evans-Wallower Zinc Company

SUBSIDIARY OF EVANS-WALLOWER LEAD CO.

Evanwall Zinc

99.99% PLUS

MONSANTO POST OFFICE

East St. Louis, Illinois

PLEASE ADDRESS REPLY TO COMPANY

January 4, 1932.

Sanitary Water Board,
State of Illinois,
Springfield, Illinois.

Gentlemen:

Please be advised that the water that we would discharge in the proposed sewer for the Village of Monsanto will be mostly well water used for our cooling system. There will be at times a slight amount of acid from leaks and washing which will be discharged to the sewer but the dilution with water should be so great that the acid effect will be at a minimum.

Very truly yours,

EVANS-WALLOWER ZINC COMPANY.

F. C. Elfred Jr.

General Manager.

FSE:R.

Evans-Wallower Zinc Company

SUBSIDIARY OF EVANS-WALLOWER LEAD CO.

Evanwall Zinc

99.99% PLUS

MONSANTO POST OFFICE

East St. Louis, Illinois

PLEASE ADDRESS REPLY TO COMPANY

January 17, 1933.

Monsanto - Pro. sewerage
Industrial wastes

RECEIVED
JAN 18 1933
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

Mr. H. F. Ferguson,
Technical Secretary,
Sanitary Water Board,
Springfield, Illinois.

Dear Sir:

This is to advise you the writer is Vice President and General Manager of the Evans-Wallower Zinc Company, and as such officer exercises the authority to execute contracts etc. Trusting this meets with your request of January 13th, we are,

Very truly yours,

EVANS-WALLOWER ZINC COMPANY,

F. S. Elfred Jr.

Vice President & General Mgr.

FSE:R.

MIDWEST RUBBER RECLAIMING COMPANY

WILLIAM WELCH President
S. G. LUTHER, V. Pres. & Gen'l Mgr.
W. A. HART Sec'y & Treas.

East St. Louis, Ill. January 4, 1933.

Mr. B. C. McCurdy,
County Sup't. Of Highways,
Court House,
Belleville, Ill.

Dear Sir:

In reply to your letter of December 29th regarding the nature of our waste water we are glad to give you the following details.

Amount--approximately 1,000,000 gallons per 24 hours all of which is pumped from deep wells. About 60% of this amount is water used for cooling purposes only, being circulated through a closed coil cooling system.

The balance is waste process water from plant operation, and is the overflow from a large Dorr classifier where the solids are collected and the water treated chemically to remove objectionable matter.

Our waste water is slightly alkaline, and shows about 625 parts to a million calculated as Calcium Carbonate. There are no ammonium compounds present other than those which would develop from the sanitary sewage of sixty men, the maximum number of employees on duty at any one time during the day.

Our waste contains no toxic substances. The Chlorine content calculated as Cl_2 is approximately 130 parts per million which is present in our well water.

The foregoing figures are based on normal full plant operation.

Trusting that this is the information that you require, we are,

Yours very truly,

MIDWEST RUBBER RECLAIMING COMPANY

S. G. Luther

Vice-President.

SGL:RC

MIDWEST
RUBBER RECLAIMING COMPANY

WILLIAM WELCH, PRESIDENT
S. G. LUTHER, V. PRES. & GEN. MGR.
W. A. HART, SEC'Y & TREAS.

RECEIVED
JAN 1[illegible] 1933
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

Monsanto - Pro. sewerage
Industrial wastes

EAST ST. LOUIS, ILL. January 17, 1933.

Sanitary Water Board,
Springfield, Illinois.

Gentlemen:

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Amount--approximately 1,000,000 gallons per 24 hours all of which is pumped from deep wells. About 60% of this amount is water used for cooling purposes only, being circulated through a closed coil cooling system.

The balance is waste process water from plant operation, and is the overflow from a large Dorr classifier where the solids are collected and the water treated chemically to remove objectionable matter.

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The foregoing figures are based on normal full plant operation.

Trusting that this is the information that you require, we are,

Yours very truly,

MIDWEST RUBBER RECLAIMING COMPANY

S G Luther
Vice President.

SGL:RC

MONSANTO CHEMICAL WORKS

SAINT LOUIS

WORKS
ST. LOUIS, MISSOURI
MONSANTO, ILLINOIS
EVERETT, MASSACHUSETTS
NITRO, WEST VIRGINIA
QUAKER, NORTH WALES
SUNDERLAND, ENGLAND

DISTRICT OFFICES
NEW YORK
BOSTON
CHICAGO
SAN FRANCISCO
LONDON

DIVISIONS

Monsanto, Illinois.

December 30, 1932.

Mr. B.C. McCurdy,
County Sup't. of Highways,
Court House,
Belleville, Illinois.

Dear Mr. McCurdy:-

In reply to your letter of December 29, 1932 with reference to the character of waste water to be discharged into the proposed sewer of the Village of Monsanto, please be advised that Monsanto's waste water consists essentially of simply water which has been pumped from 100 Ft. depth wells and used for cooling purposes. Occasionally there may be small quantities of muriatic or sulphuric acid enter the sewer system, but such quantities are so small that the alkaline character of the water is maintained. Occasionally there may be discharged through the sewer system solutions containing sodium salts, such as sodium sulphate, sodium sulphite, and sodium chloride. The maximum concentration of sodium salts in our sewer water would not exceed one part in fifteen thousand; probably 80% of the time the concentration of these sodium salts would not be more than one part in thirty thousand. There will be, of course, the normal toilet sewage which might be expected from a plant employing four hundred people.

As a matter of fact, for our own protection against losses we maintain a rigid system of inspection, by laboratory analysis, of our waste waters. Laboratory tests are made on sewer water taken from various parts of the plant always daily, and sometimes hourly if there is any indication of any unusual condition existing in the sewer system. There are no sludges or highly toxic materials discharged into the sewer system.

Very truly yours,

MONSANTO CHEMICAL WORKS,

By - F.B. Langreck,
Manager.

RP

MONSANTO CHEMICAL WORKS

SAINT LOUIS

WORKS
ST. LOUIS, MISSOURI
MONSANTO, ILLINOIS
EVERETT, MASSACHUSETTS
NITRO, WEST VIRGINIA
RUABON, NORTH WALES
CUNDERLAND, ENGLAND

DISTRICT OFFICES
NEW YORK
BOSTON
CHICAGO
SAN FRANCISCO
LONDON

DIVISIONS
MERRIMAC CHEMICAL COMPANY, INC
BOSTON, MASSACHUSETTS
RUBBER SERVICE LABORATORIES COMPANY
AKRON, OHIO
MONSANTO CHEMICAL WORKS, LTD.
LONDON, ENGLAND

CABLE ADDRESS
MONSANTO-ST. LOUIS
CODES
A.B.C. 5TH AND 6TH
WESTLEY'S 2ND PHRASE
WESTLEY'S
ACME

RECEIVED
JAN 25 1933
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

Monsanto - Prop. sew.
Industrial wastes

Monsanto, Illinois,
January 23, 1933.

State Sanitary Water Board,
Springfield, Illinois.

Attention: Mr. Harry F. Ferguson
Chief Engineer.

Gentlemen:-

With reference to the character of waste water to be discharged by Monsanto Chemical Works into the sewer of the Village of Monsanto, please be advised as follows:

Waste water, amounting to about 1500 G.P.M., consists essentially of simply water which has been pumped from 100 ft. depth wells and used for cooling purposes. Occasionally, as a matter of accident, there may be small quantities of acid enter the sewer system, but such quantities are so small that the alkaline character of the water is maintained. Occasionally there may be discharged through the sewer system solutions containing sodium salts, such as sodium sulphate and sodium chloride. The maximum concentration of sodium salts in our sewer water would not exceed at any time one part in fifteen thousand, and probably 90% of the time the concentration of these sodium salts is not more than one part in thirty thousand. In addition to this, there is the normal toilet sewage which might be expected from a plant employing 400 people.

A rigid system of inspection, by laboratory analysis of our waste water, is maintained and records of the analyses are kept. Laboratory tests are made on sewer water taken from various parts of the plant always daily, and sometimes hourly if there is any indication of any unusual condition existing in the sewer system. In the event of an acid spill or other accident, steps are taken to neutralize such acid immediately so that the safe character of the water leaving the plant is maintained. There are no sludges or highly toxic materials discharged in our waste water.

Very truly yours,

MONSANTO CHEMICAL WORKS,

By F.B. Langreck
F.B. Langreck
Assistant Vice President.

RP

MOBILE AND OHIO RAIL ROAD COMPANY
ERNEST E. NORRIS, RECEIVER

A. WOOD,
CHIEF ENGINEER

SAINT LOUIS, MO.

January 4, 1933.

Mr. B. C. McCurdy,
Civil Engineer,
Belleville, Illinois.

Dear Sir:

Your letter of December 29th addressed to the Mobile and Ohio Railroad Company and four other Corporations, with reference to the proposed sewer system in the Village of Monsanto, has just reached me for handling.

I find no information in our own Engineering Department on this project except a profile of the proposed sewer, dated December 1928, and furnished January 10, 1929 by Mr. D. O. Thomas.

I am unaware of any arrangements having been made for the Mobile and Ohio to make use of the proposed sewer but in case connection is made thereto it would most likely be to take care of the entire storm and sanitary drainage from the Colson roundhouse, which would include the refuse from our water treating plant.

We use lime, soda ash and sodium aluminate in the water treating plant, and the solids brought out of the water through reaction are discharged daily from the treating tank. The water from the roundhouse would be mostly water which has been used in washing locomotive boilers.

Perhaps it would be best for us to arrange a meeting so that each may understand better what the other is doing.

Yours very truly,

H. Austell
Bridge Engineer.

HA:G.

MOBILE AND OHIO RAIL ROAD COMPANY
ERNEST E. NORRIS, RECEIVER

B. A. WOOD,
CHIEF ENGINEER

SAINT LOUIS, MO.

RECEIVED
JAN 19 1933
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

January 16, 1933.

Monsanto - Proposed sewerage
Industrial wastes.

State of Illinois
Sanitary Water Board,
Springfield, Ill.

Att: Mr. Harry V. Ferguson, Technical Sec.

Dear Sir:

Your letter of the 13th instant addressed to this Company in regard to Monsanto sewer system.

Any use which this Company would make of the proposed sewer would most likely consist of taking care of the entire storm and sanitary drainage from Tolson Roundhouse, which would include the refuse from our Water Treating Plant.

We use lime, soda ash and sodium aliminate in the water treating plant, and the solids brought out of the water through reaction are discharged daily from the treating tank. The water from the Roundhouse would be mostly water which has been used in washing locomotive boilers.

Yours very truly,

B A Wood

Chief Engineer.

BAW:C.

Exhibit 77

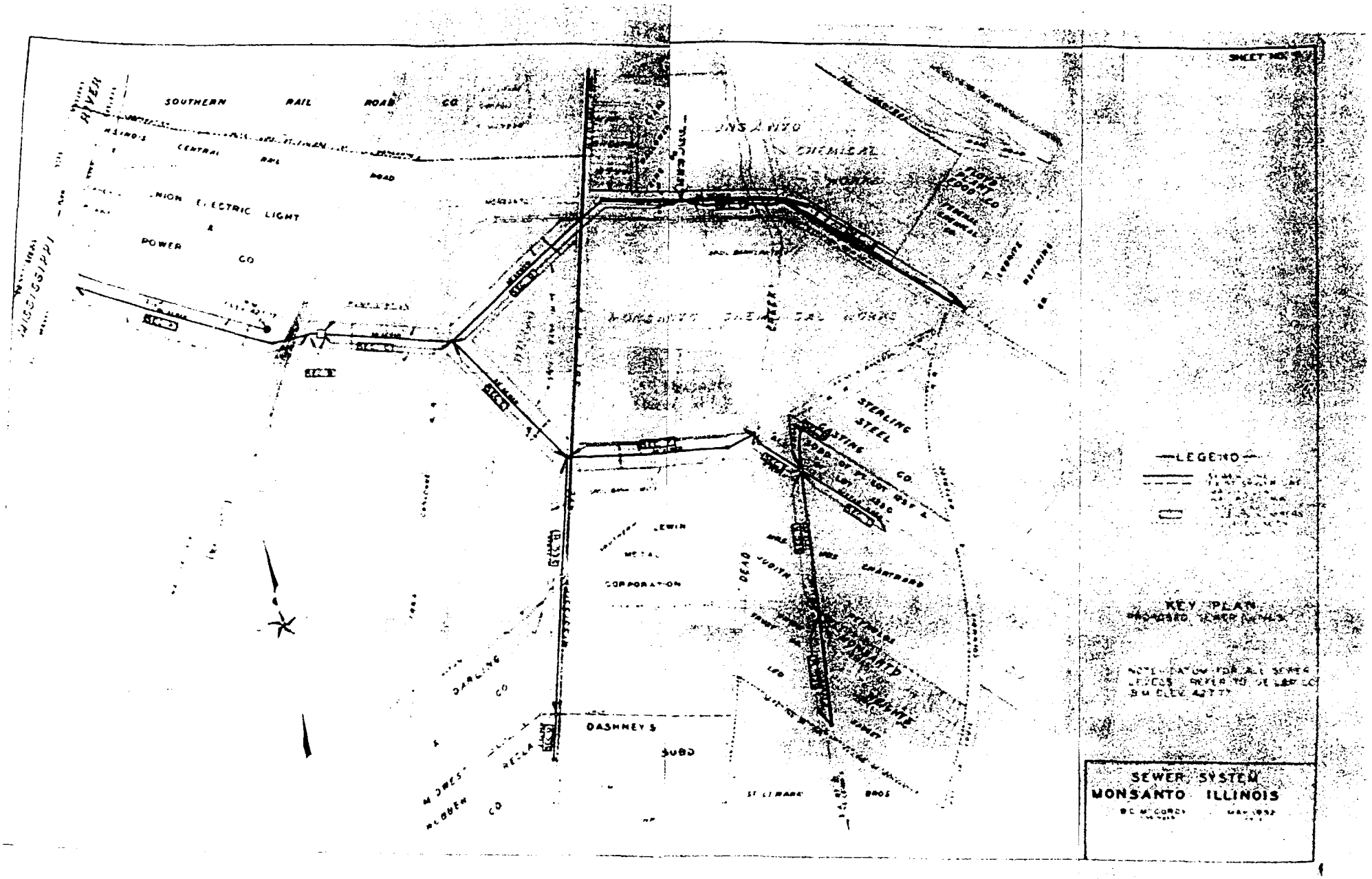
SOUTHERN RAIL ROAD CO
CENTRAL RAIL ROAD
UNION ELECTRIC LIGHT & POWER CO
MISSISSIPPI RIVER
MONSANTO CHEMICAL WORKS
STERLING STEEL CASTING CO
LEWIN METAL CORPORATION
DEAD JUDITH
CHARTRAND
DARLING CO
DASHNEY'S SUBD
ST LEWARD BROS
LEGEND
KEY PLAN
SEWER SYSTEM
MONSANTO ILLINOIS

Exhibit 78

E. C. McCURDY
SUPERINTENDENT

ST. CLAIR COUNTY
OFFICE OF
SUPERINTENDENT OF HIGHWAYS
COUNTY HIGHWAY BUILDING
BELLEVILLE, ILLINOIS

TELEPHONE 1300-1301
WESTERN UNION
TELEGRAPH

RECEIVED
FEB 1 1939
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

January 30, 1939

State Sanitary Water Board
Springfield, Illinois

Gentlemen:

I am enclosing copies in triplicate, of the plan for the proposed construction of two laterals, Number 1 and 2 by the Village of Monsanto.

You will find in your files, plans for the original sewer system constructed in 1932-1933.

Due to the large industrial holdings in this Village, it is impossible to accurately forecast the development of the area. Manchester Subdivision is a low cost Housing Development of the Monsanto Chemical Company. In event plans for the expansion of that industry require additional land, the houses will necessarily be removed. At the present time the houses are without basements. If they were rebuilt they doubtless would be built with basements, in which event we would resort to a booster pump.

The property on the West side of Mississippi Avenue is owned largely by Railroad and Utility companies who only lease the premises to the occupants.

I would appreciate your expediting the approval of these plans in order that construction may begin without delay, a new Tavern having been established on the West Side of Mississippi Avenue and which is without adequate sewage disposal facilities.

Yours truly,

E. C. McCurdy
Village Engineer

ECMcC/RR

Lateral 1# 310' of 8" @ 0.80%
Lateral 2# 227' of 12" @ 0.50%

MONSANTO-Sewerage
Permit #1939-21

February 3, 1939

Village President and Board of Trustees
Monsanto, Illinois

Permit is hereby granted to the Village of Monsanto, St.Clair County, Illinois, to construct and maintain two lateral sewer extensions with outlet into an existing sewer, all in accordance with plans submitted by B. C. McCurdy, acting as your agent, said plans comprising two sheets and designated as "Village of Monsanto", being made a part hereof.

This permit is issued subject to the following conditions:

1. This authority is granted in accordance with the provisions of an act entitled "An Act to establish a Sanitary Water Board and to control, prevent and abate pollution of the streams, lakes, ponds, and other surface and underground streams in this State", approved June 25, 1929; in force July 1, 1929 and subject to the provisions thereof.

2. This authority shall not be considered as in any manner affecting the title to the premises upon which the sewerage works in question are to be located.

3. This authority does not in any way release the permittee from any liability for damage to person or property caused by or resulting from the installation, maintenance or operation of the sewerage system, located and constructed in accordance with the plans and specifications herein referred to.

4. The Sanitary Water Board in issuing this permit has relied upon the statements and representations made by the permittee in the application hereof and in case any statement or representation in said application is found to be incorrect this permit may be revoked without further notice and the permittee thereupon waives all rights thereunder.

5. There shall be no deviations from the plans and specifications submitted with the application for this permit unless revised plans and specifications therefor shall first have been submitted to the Sanitary Water Board and a supplemental written permit issued therefor.

6. The Sanitary Water Board or any person duly authorized by it may, at any time during the progress of the construction or the installation of the sewerage system or any part thereof under authority hereof, have the right and authority to inspect such work during the progress thereof; and, such Board or its duly authorized agent shall have the authority at any and all times after the erection or the installation of such sewerage system to inspect the same or the operation thereof.

SANITARY WATER BOARD

By_____
Technical Secretary

And_____M.D.
Chairman

sdg-e

cc. B. C. McCurdy
Village Engineer

1000

able, always provided, however, that the mortgagor, shall pay interest on said indebtedness, when due, according to the tenor and effect of the promissory note or notes evidencing the same, and shall also comply with all other terms, conditions, and covenants entered into by said mortgagor in said mortgage, the lien of which is hereby extended and in this agreement.

This Agreement shall be recorded in the Office of the Recorder of Deeds of St. Clair County Illinois, and the certificate of the Recorder hereto attached shall be deemed a part hereof, Any party to this agreement is hereby appointed agent of all other parties hereto for the special purpose of filing this agreement for record.

In Witness Whereof, the Illinois State Trust Company as Trustee, under the last will and testament of George Gerold, deceased pursuant to a resolution adopted by its Board of Directors has caused these presents to be executed by its President or its corporate seal affixed thereto, attested by its Assistant Secretary and the mortgagors have hereunto set their hands and seals this 22nd day of September, A.D. 1942.

Corporate Seal
(Corporate Seal)

Illinois State Trust Company as Trustee under the last will and testament of George Gerold deceased.

Attest:
C G Rogers
Secretary

By A C Johnson
President

Mary E. Gerold (Seal)

E. F. Gerold (Seal)

State of Illinois)
County of St. Clair) ss.

I, the undersigned, a Notary Public in and for said County in the State aforesaid, Do Hereby Certify, That Mary E. Gerold and E. F. Gerold, her husband, personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument as -- free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of the right of homestead.

Given under my hand and notarial seal this 22nd day of September A.D. 1942.

(Notarial Seal)

George Gerold
Notary Public

Filed for record this 11th day of February A.D. 1944 at 8:25 A.M. Instr #409967

* * * * * * * * * * *

This Indenture made the seventh day of April, A.D., 1939, between Monsanto Chemical Company, a Corporation organized and existing under and by virtue of the laws of the State of Delaware, having its principal office in the City of St. Louis, Missouri, and licensed to do business in and by the State of Illinois, Grantor, and Village of Monsanto, a Municipal Corporation organized and existing under and by virtue of the laws of the State of Illinois and located in the County of St. Clair and State of Illinois, Grantee; Witnesseth: that

Whereas, the President of the Board of Trustees of the Village of Monsanto, on behalf of the Grantee, finds it necessary and expedient that an overflow for the Village Sewer System be constructed to permit the discharge of surplus surface waters into Dead Creek through a certain Thirty-six (36) inch cast iron pipe now existing under the tracks of the Alton & Southern Railroad, through which the waters of Dead Creek flow; and

Whereas, the said construction requires the installation of a Manhole and a Thirty-six (36) inch sewer line, with its appurtenances, in and upon the lands owned by the said Grantor.

Now Therefore, Witnesseth, that in consideration of the sum of One Dollar ($1.00) paid by the said Grantee to the said Grantor, the receipt thereof is hereby acknowledged, the Grantor, as the owner of that part of Lot numbered One Hundred Twenty-five (125) of the Commonfields of Cahokia and Lots numbered One Hundred Twenty-two (122) and One Hundred Twenty-three (123) of

(5)(X)

Third Subdivision of Cahokia Commons, lying northerly of the Alton & Southern Railroad, all situated in the Village of Monsanto, County of St. Clair and State of Illinois, according to the plats thereof recorded in the Recorder's Office of St. Clair County, Illinois, hereby grants to the Grantee the right to construct, operate and maintain a thirty-six (36) inch pipe on that part of the aforesaid described premises, within a strip of land ten (10) feet in width lying between the existing twenty-four (24) inch trunk line sewer constructed in the year, 1932, and the northerly right-of-way line of said Alton & Southern Railroad, the center line of said ten (10) feet strip being described as follows:

Beginning at a point in the center line of said twenty-four (24) inch trunk line sewer, from which an existing Manhole at the eastern terminus of said twenty-four (24) inch trunk line sewer bears easterly 68.8 feet; thence southwesterly on a line that forms an angle of 99° 47' measured clock wise from the said Manhole, a distance of forty (40) feet, more or less, to the Northerly right-of-way line of said Alton & Southern Railroad.

The Grantor herein grants the right to the Grantee, its officials, contractors, agents and employees the right to reasonable means of egress and ingress on the lands owned by the Grantor for the purpose of construction, operation and maintenance of said thirty-six (36) inch pipe; and

The Grantor further grants the right to said Grantee, its officials, contractors, agents and employees to occupy an area about the site of the proposed work for the purpose of the construction thereof. The foregoing rights granted to the Grantee, its officials, contractors agents and employees are subject to the restriction that, in exercising such rights, the Grantee, its officials, contractors, agents and employees shall not interfere unnecessarily with the operation of the Grantor's property, nor its employees.

In Witness thereof, the said Monsanto Chemical Company hath caused these presents to be signed by Charles Belknap, its Executive Vice President, and its corporate seal to be hereunto affixed, attested by W W Schneider its Secretary, the day and year first above written.

(No Corporate Seal) Monsanto Chemical Company

Attest: By Charles Belknap
W. W. Schneider Executive Vice President
Secretary

State of Missouri)
SS
City of St. Louis)

I, H J Widman a Notary Public, in and for said City in the State aforesaid, do hereby certify that Charles Belknap personally known to me to be the Executive Vice President of Monsanto Chemical Company and W. W. Schneider, personally known to me to be the Secretary of said Corporation, whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged, that as such Executive Vice President and Secretary, they signed and delivered the said instrument of writing as Executive Vice President and as Secretary of said Corporation, and caused the seal of said Corporation to be affixed thereto, pursuant to authority given by the Board of Directors of said Corporation as their free and voluntary act, and as the free and voluntary act and deed of said Corporation for the uses and purposes therein set forth.

Given under my hand and notarial seal this 24th day of April, A.D. 1939.

(Notarial Seal-City of St. Louis, Mo.) H J Widman
My Commission Expires November 13, 1941 Notary Public

Filed for record this 11th day of February A.D. 1944 at 10:30 A.M. Instr. #409974

* * * * * * * * * * * *

Village - St. Clair County

Subject Monsanto - Sewer extension

Data B.C. McCurdy - plans

Reviewed by Carl D. Gross Date Feb 5, 1941

Proposal for 100'± of 24" V.C.P. to be encased in reinforced concrete; grade 1.75'/1000' (0.175%); depth to crown is 9 to 10 feet.

The extension to serve U.S. Govt. property to be operated by Monsanto Chemical Co. is to run from the property, under and across Monsanto Ave. to an existing 30" V.P. main sewer of the Village, about midway between Mississippi Ave. (S.B.I. #3) and Falling Springs Ave.

Heavy encasement of reinforced concrete probably planned because of poor foundation soil.

No information relative to quantity or character of wastes to be discharged, and according to McCurdy's letter there is no added information available upon the Govt. sponsored manufacturing activities planned.

Permit to be issued today.

N.R.Cross
Dwight H.Green
L.E.Osborne
H.Leonard
W.A.Rosenfield

February 5, 1941

MONSANTO Sewerage
Permit #1941-14

Village President and Board of Trustees
Monsanto, Illinois

Permit is hereby granted to the Village of Monsanto, St. Clair County, Illinois, to construct and maintain a sewer extension crossing Monsanto Avenue to serve United States Government property to be operated by the Monsanto Chemical Company and to outlet into an existing 30-inch main sewer, all in accordance with plans submitted by E. C. McCurdy, acting as your agent, said plans consisting of 4 sheets and entitled "Village of Monsanto, Sewer Connection Station 7+75 Section D", being made a part hereof.

This permit is issued subject to the following conditions:

1. This authority is granted in accordance with the provisions of an act entitled "An Act to establish a Sanitary Water Board and to control, prevent and abate pollution of the streams, lakes, ponds, and other surface and underground streams in this State", approved June 25, 1929; in force July 1, 1929, and subject to the provisions thereof.

2. This authority shall not be considered as in any manner affecting the title to the premises upon which the sewerage works in question are to be located.

3. This authority does not in any way release the permittee from any liability for damage to person or property caused by or resulting from the installation, maintenance or operation of the sewerage system, located and constructed in accordance with the plans and specifications herein referred to.

4. The Sanitary Water Board in issuing this permit has relied upon the statements and representations made by the permittee in the application herefor and in case any statement or representation in said application is found to be incorrect this permit may be revoked without further notice and the permittee thereupon waives all rights thereunder.

5. There shall be no deviations from the plans and specifications submitted with the application for this permit unless revised plans and specifications therefor shall first have been submitted to the Sanitary Water Board and a supplemental written permit issued therefor.

6. The Sanitary Water Board or any person duly authorized by it may, at any time during the progress of the construction or the installation of the sewerage system or any part thereof under authority hereof, have the right and authority to inspect such work during the progress thereof; and, such Board or its duly authorized agent shall have the authority at any and all times after the erection or the installation of such sewerage system to inspect the same or the operation thereof.

STATE SANITARY WATER BOARD

By _____
Technical Secretary

And _____ M.D.
Chairman

cdg-c

cc. E. C. McCurdy, Mgr.
District #16

P.S. Att. Mr. McCurdy: Your letter dated February 3, requesting immediate action upon the extension to serve U.S. Government property was received late February 4, consequently could not be acted upon by this Board prior to the board meeting of February 4.

You sent 3 copies of the plans. Please advise if you desire the extra ten copies returned to you.

C.W.K.

HOME OFFICE: BELLEVILLE, ILL.

PHONE: EXPRESS 666

B. C. McCURDY
Consulting Municipal Engineer

RECEIVED
JUL 13 1942
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

July 11, 1942

Sanitary Water Board

Springfield, Illinois

Gentlemen:

At my direction, the Commercial Blue Print Company of St. Louis, Mo. is forwarding you, in triplicate, the plan for certain sewer improvements in the Village of Monsanto, known officially as "Extensions and Improvements-Public Sewer System".

You will find in your files, plans for the original sewer system constructed in 1932-1933.

Due to the tremendous increase in the volume of production of the War Industries located in the Monsanto Industrial District and the necessity for insuring their continuous operation, the Village has issued and sold $200,000 in Sewer Bonds, obtained the necessary priority ratings from the W.P.B., are making application to the Division of Waterways, Department of Public Works and Buildings of Illinois and have obtained the approval of the District Engineer [illegible] the War Department.

Your immediate and favorable consideration of these plans will be conductive to the War effort.

Yours truly,

B. C. McCurdy
Consulting Engineer

BCMcC/ER

P.S. Please do not hesitate to call me, charges reversed, if it is necessary to clear up any matters in connection with obtaining your approval of these plans.

MEMORANDUM

MONSANTO-Sewerage
Proposed relief sewer

July 14, 1942

Plans were recently submitted for a 36-inch relief sewer, pumping station, and a box culvert approximately 4x5 feet and a pumping station to the river. Inasmuch as design data was not submitted with these plans and there seems to be considerable rush in starting this work, B. C. McCurdy, Monsanto City Engineer was contacted by telephone on July 14.

He stated that it had been impossible to base the design of these sewers and pumping station on quantities to be expected from the various industries in Monsanto. The domestic sewage tributary to the Monsanto sewer system is negligible and the industries will not give out information on the volumes of their waste. He stated that it is believed that the existing 36-inch sewer is 50% overloaded and that another 36-inch sewer which is proposed should carry the flow for some time to come. The box culvert was designed to carry the combined flows from three 36-inch sewers.

Two 20inch pumps having a capacity of 15,000 gallons per minute at 11 foot head and 8000 g.p.m. each at 30-foot head willbe provided. One pump will be taken from the old pumping station and installed in the new station.

The old pumping station will not be abandoned but will be kept as a standby.

Elevations of the existing sewers as shown on the plans we received in 1932, and on the present plans do not agree. McCurdy stated that this discrepancy was caused by the use of different datums.

McCurdy will write this office giving the information outlined above. It is believed that a permit can be issued as soon as this letter is received.

A. A. Thomas
Junior Sanitary Engineer

aat-o

cc. Dist. #17

HOME OFFICE: BELLEVILLE, ILL. PHONE: EXPRESS 544

B. C. McCURDY
Consulting Municipal Engineer

July 17, 1942

RECE...
JUL 1...
DIVISION OF ...
ILLINOIS DEPT ...

Sanitary Water Board

Springfield, Illinois

Gentlemen:

With further reference to the plans submitted to you for approval, entitled "Extensions and Improvements-Public Sewer System- Monsanto, Illinois".

The flow in the present sewer system exceeds the capacity of the Pumping equipment and the 30" discharge line between the present pumping station and the Mississippi River out-fall, is not only inadequate, but shows signs of failure.

By observation it appears that the present volume of waste water that should be carried and pumped to the River exceeds the capacity of the present 36" trunk line sewer whose capacity is estimated at 14,000 ± G.P.M. Increase in plant capacity and new plants in the area indicates that the volume will rise to 20,000+ G.P.M. during the emergency. It is apparent that due to the type of Industries concentrating in this area, the unlimited capacity of the Cahokia Plant of the Union Electric Light & Power to furnish current, that the ultimate development may require twice this capacity, or about 40,000 G.P.M. and that it would be wisdom in the present construction to provide for this ultimate, in so far as the outlet sewer is concerned.

The box sewer section of the sewer between the proposed new pump house and the River, when under gravity flow, has a capacity of approximately 90 C.F.S. 40,500 gpm The proposed new pump house is designed to accommodate 3-100 H.P. Units. The W.P.B. has approved the purchase of two of these units and orders have been placed for delivery of 2-20" mixed flow centrifugal pumps operated at 585 R.P.M. which show a capacity of 15,000 G.P.M. at 11 ft. T.D.H.;10,000 gallon capacity at 26 ft. T.D.H. and 8,000 gallon capacity at 30 ft. T.D.H. It is proposed, as a matter of efficiency, to move one of the 3-50 H.P. pumps from the present pumping station to act as a third unit in the new station, permitting the present 2-50 H.P. Pumps to remain in operating condition in the present station. Based on the Mississippi River Hydrograph for the 71 year period, prior to 1931, and assuming that the gravity flow will operate to approximately 13 feet on the gauge, the average T.D.H. will be 11 ft.

The design of the Pumping Station, while it appears to differ somewhat from the conventional design, results from our past experience in handling this problem, also it fits into the general scheme of avoiding the use of critical material. The Pump House will be without valves or other fittings, except one closing piece between the suction and discharge ends of the Pumps. An improvised flap valve will be added at the surge chamber end of the discharge to prevent counter rotation of the Pumping units. It is to be noted that the Pump House is to be equipped with an automatic sump pump with a capacity of 300 G.P.M. at 45 ft. T.D.H., which will drain into the river side of the last water gate at the surge chamber. The electric motors are to be totally

enclosed, fan cooled, mounted in the open for the dual purpose of avoiding possible explosions from accumulated gases and to permit ready dismanteling, for the latter, an overhead trolley has been provided, on which will operate a 3-4 gross ton hoist.

The river section of the box has been designed to with-stand an earth fill raised to the heighth of the new Mississippi River Front Levee, i.e. 427 and a hydrostatic pressure equivalent to a River gauge of 46.5 with the assumption that the earth has been removed to within 10 feet of the top of the sewer, the area thru which the sewer passes having been leveed by the construction of a Sea Wall, similar to the development of the adjacent property of the Cahokia Power Plant. The 36" sewer section leading east from the Pump Station follows the design adopted 10 years ago, which has since become a standard design with the industries in the area, except that the percentage of steel has been reduced and the volume of concrete increased.

It is expected that as quickly as the Village has provided for the additional outlet capacity, that the north branch, i.e. along Monsanto Avenue, must be paralleled with a second line, to lower the levels in the sewer serving the Socony-Vacuum Refinery, United States Chemical Warfare Plant and the American Zinc Electrolytic Refinery.

The use of the vitrified clay liner plate design with sulphur silica seal is the result of previous experience in reconstructed manholes that failed in the original system. The design of the flow line of the outlet sewer at the River is based on the theory that it will produce a minimum scour. This was substantiated in the case of the extension and reconstruction of the outlet on the original system.

The proposed improvements have the approval of the industries that represent 95% of the taxes paid in the Village.

Yours truly,

B. C. McCurdy
Consulting Engineer

BCMcC/RR

U. W. Klassen

STATE OF ILLINOIS

DWIGHT H. GREEN, Governor

PERMIT No. 5265

Department of Public Works and Buildings

Division of Waterways

201 W. Monroe St.
Springfield, Illinois

COPY

Permission Is Hereby Granted, this 28th day of July, A. D., 1942,

To

VILLAGE OF MONSANTO,
ST. CLAIR COUNTY, ILLINOIS,

To construct, operate and maintain a second sewer outfall, located fifty (50) feet downstream from existing 30" sewer outfall on Illinois side of the Mississippi River on accretions to Lots 224 and 225, Third Subdivision, Cahokia Commons, St. Clair County, Illinois,

in accordance with an application dated July 14, 1942, and the specifications and plans entitled

Proposed Extensions of Improvements
Public Sewer System
Village of Monsanto
2 sheets June 23, 1942
E. C. McCurdy, Consulting Engineer

filed with the Department of Public Works and Buildings and made a part hereof, and subject to the terms and special conditions contained herein:

Examined and Recommended: Approved:

E. Dee Dewey, Engineer of Permits. Walter A. Rosenfield, Director.

Approval Recommended:

Thos. B. Casey, Acting Chief Engineer.

File: 1914-P

(8557) 7 (OVER)

THIS PERMIT is subject to the following conditions:

(a) This permit is granted in accordance with an act entitled: "AN ACT in relation to the regulation of the rivers, lakes and streams of the State of Illinois," approved June 18, 1911.

(b) This permit does not convey or recognize any title of the Permittee to any submerged or other lands, and furthermore, does not convey, lease or provide any right or rights of occupancy or use of the public or private property on which the proposed project or any part thereof will be located, or otherwise grant to the Permittee any right or interest in or to said property whether said property is owned or possessed by the State of Illinois or by any private or public party or parties.

(c) This permit does not in any way release the Permittee from any liability for damage to persons or property caused by or resulting from the work covered by this permit, and does not sanction any injury to private property or invasion of private rights, or infringement of any Federal, State or local laws or regulations.

(d) The Permittee shall remove all piling, cofferdams, false work, excavation and the material incident to the construction of the project herein authorized, from the river, stream or lake in which the work is done, at his own expense. Should the Permittee fail to remove such structures or material, the State reserves the right to have such removal made at the expense of the Permittee. If future operations for public navigation by the State or Federal Government or public interests of any character necessitate any changes in the position of any part of the structure or structures herein authorized, such changes shall be made by and at the expense of the Permittee or his successors in such manner as shall be fixed and determined by the State of Illinois, acting by and through the Department of Public Works and Buildings, or other properly constituted agency, and within sixty (60) days from receipt of written notice of such necessity from said Department or other properly constituted agency.

(e) If the work herein permitted is not completed on or before December 31, 1963, this permit shall cease and be null and void.

(f) The execution and details of the work hereby authorized shall be subject to the supervision and approval of the Department of Public Works and Buildings—Division of Waterways.

(g) Starting work on the construction hereby authorized shall be considered full acceptance by the Permittee of all the terms and conditions of this permit, however, the attached acceptance, properly executed by the Permittee, must be filed in the office of the Department of Public Works and Buildings, Division of Waterways, Springfield, Illinois, within sixty (60) days of the date hereof or this permit shall be null and void.

(h) There shall be no deviation from the plans submitted and hereby approved unless the proposed change in plans shall first have been submitted to and approved, in writing, by the State of Illinois acting by and through its Department of Public Works and Buildings.

(i) The Department of Public Works and Buildings in issuing this permit has relied upon the statements and representations made by the Permittee in his application therefor, and in case any statement or representation in said application is found to be false, this permit may be revoked at the option of the Department of Public Works and Buildings, and when so revoked all rights of the Permittee hereunder shall thereupon and thereby become null and void.

(j) If the Permittee is required by an act of Congress to obtain a permit from any Federal authority for leave to do the things granted by this permit, then such Federal permit shall be obtained before this permit becomes effective.

(k) If the project authorized herein is located in or along a lake, the Permittee or his successors, shall make no claim whatsoever to any right, title or interest in and to any accretions caused by the construction of said project, and by the acceptance of this permit agrees to remise, convey, release, and quit claim unto the People of the State of Illinois, for the use and benefit of the public, all rights to any accretions which may accrue to said real estate because of said project.

(l) This permit is subject to further special conditions as follows:

This permit is void unless a permit for the proposed relief sewer is issued by the State Sanitary Water Board.

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SANITARY ENGINEERING
DIV. OF PUBLIC HEALTH

July 30, 1942

MONSANTO-Sewerage
Permit #1542-45

Village President and Board of Trustees
Monsanto, Illinois

Permit is hereby granted to the Village of Monsanto, St. Clair County, Illinois, to construct and maintain an interceptor manhole, a pump house, and approximately 2000 feet of relief sewer with outlet into the Mississippi River, all in accordance with plans and letter submitted by B. C. McCarty, acting as your agent, said plans designated as "Proposed Extensions and Improvements, Public Sewer System, Village of Monsanto", and comprising 28 sheets, being made a part hereof.

This permit is issued subject to the following conditions:

1. This authority is granted in accordance with the provisions of an act entitled "An Act to establish a Sanitary Water Board and to control, prevent and abate pollution of the streams, lakes, ponds, and other surface and underground streams in this State", approved June 28, 1929; in force July 1, 1929, and subject to the provisions thereof.

2. This authority shall not be considered as in any manner affecting the title to the premises upon which the sewerage works in question are to be located.

3. This authority does not in any way release the permittee from any liability for damage to person or property caused by or resulting from the installation, maintenance or operation of the sewerage system, located and constructed in accordance with the plans and specifications herein referred to.

4. The Sanitary Water Board in issuing this permit has relied upon the statements and representations made by the permittee in the application herefor and in case any statement or representation in said application is found to be incorrect this permit may be revoked without further notice and the permittee thereupon waives all rights thereunder.

5. There shall be no deviations from the plans and specifications submitted with the application for this permit unless revised plans and specifications therefor shall first have been submitted to the Sanitary Water Board and a supplemental written permit issued therefor.

~~[illegible] Sewerage~~
Permit #1942-45

6. The Sanitary Water Board or any person duly authorized by it may, at any time during the progress of the construction or the installation of the sewerage system or any part thereof under authority hereof, have the right and authority to inspect such work during the progress thereof; and, such Board or its duly authorized agent shall have the authority at any and all times after the erection or the installation of such sewerage system to inspect the same or the operation thereof.

7. This permit applies only to sanitary features of the project and does not give authority for any stream channel change or overflow alteration or new outlet without meeting all requirements of the Division of Waterways, Department of Public Works and Buildings, State of Illinois.

8. This permit is void after July 20, 1945, unless construction on this project has started on or prior to this date.

STATE SANITARY WATER BOARD

By_____
Technical Secretary

And_____ M.D.
Chairman

sat-c
cc. E. C. McCurdy, Engr.
Belleville
Div. of Waterways
Dist. Health Unit #18

REPORT ON INDUSTRIAL WASTE DISCHARGE FROM INDUSTRIES AT MONSANTO

MONSANTO--Industrial waste discharge

Date------March 6, 1942

Interviewed--Mr. McCurdy, City Engineer for the Village of Monsanto

Mr. McCurdy wished to inform the Sanitary Water Board of work being done on sewers carrying industrial wastes from the industries in Monsanto to the Mississippi River. He stated that under certain conditions it might be necessary to discharge these wastes to a creek running through a residential area outside of the village limits. If this should happen, the residents in this area might complain to the Board; and, therefore, Mr. McCurdy wanted us to be acquainted with the situation.

Industries located in the village are:

Monsanto Chemical Co.	Federal Chemical Co.
American Zinc Co.	U. S. Chemical Warfare Service
D. Lubrite Refining Co.	Darling Fertilizer Co.
Lewin Metals Reclaiming Co.	Union Electric Power Co.
Sterling Steel Corp.	
Midwest Rubber Reclaiming Co.	

The power plant contributes no industrial wastes, but pays practically 60% of the taxes.

The village plans and expects to construct a new sewer parallel to the old one carrying wastes to the river. Wastes will be collected in a pumping station and discharged through this new line which is 57 1/2 X 56 inches cross-sectional area, and which is lined with vitrified tile plates to prevent rapid deterioration from acids.

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Levels are such that when the river stage is less than 15 feet waste will flow by gravity. At present, waste discharge amounts to approximately 1500 g.p.m. but it is expected that this will be increased by 3000 g.p.m. With the increased quantity and a high river stage, It is probable that, when the wastes are being pumped to the river, a rupture might occur in the discharge line. It was predicted that if the river stage reached a 40-foot-gauge reading, rupture might occur. In case of such rupture or in the case of failure of the two pumps that are being provided, it would be necessary to discharge wastes to an open ditch that flows south through the Village of Cahokia and thence to the river.

Several years ago some wastes were discharged to this open ditch flowing south and the industries at Monsanto were sued by those residents living between the villages of Monsanto and Cahokia. At that time the industries were required to pay complainants $4,000.00. Mr. McCurdy stated that, because of war activities, the industries would not be able to shut down, should the main sewer line become unavailable for discharge of wastes; and that, regardless of complaints received, it would then be necessary to discharge wastes through this ditch draining toward Kahokia. This ditch is kept clean and receives raw sewage from those persons living close to it who would normally be the complainants. It is felt that even though industrial wastes would have a slight odor their discharge to the ditch would be beneficial since the great volume of water would flush settled solids into the Mississippi River.

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The industries are financing this new sewer, which will cost approximately $200,000.00, and the third reading of the bond issue was recently read. It is expected that a contract will be let in April and that work should be started by May 1.

Mr. McCurdy reported that Monsanto Chemical Co. makes regular tests on the wastes passing through the present pump house. He does not know what these tests are or for what purpose they are made. It was stated that the present outfall extends a considerable distance into the river and discharges at a zero river gauge. It is usually under water, and wastes are well mixed with the river water in a short distance.

Wm. A. Hasbrouck
Senior Sanitary Engineer

wah:s

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Exhibit 79

Exhibit 79

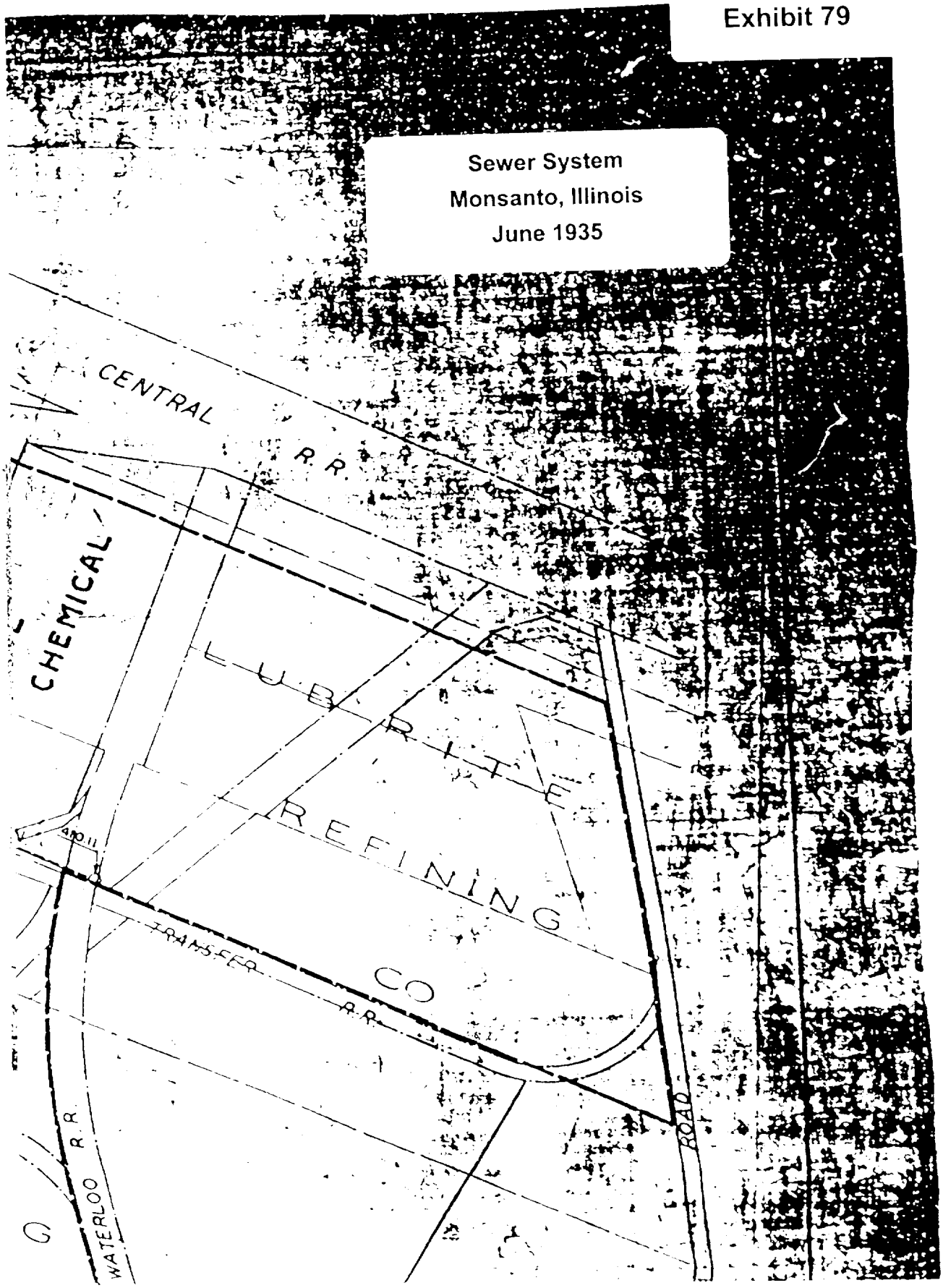
Sewer System
Monsanto, Illinois
June 1935
CENTRAL
R.R.
CHEMICAL
LUBRITE
REFINING
CO
TRANSFER
R.R.
ROAD
WATERLOO
R.R.

Exhibit 80

Report on Investigations of Use of Dead Creek as a Surge Pond for the Village of Sauget Sewer System

By: George M. Sallwasser
Senior Consultant

Horner & Shifrin, Inc.
Engineers/Architect/Planners
St. Louis, Missouri

September 1994

REPORT ON INVESTIGATIONS OF USE OF DEAD CREEK AS A SURGE POND FOR THE VILLAGE OF SAUGET SEWER SYSTEM

By: George M. Saltwasser, Senior Consultant
Horner & Shifrin, Inc., Consulting Engineers St. Louis, Missouri

September, 1984

Introduction

Horner & Shifrin has been retained by the Cerro Copper Products Company through their attorneys, Lowenstein, Sandler, Kohl, Fisher & Boylan, to investigate the use of Dead Creek as a surge pond for the Village of Sauget sewer system. The investigation has been based on information available to us from our own files, as well as information furnished to us by others for this investigation. Horner & Shifrin has extensive information in its files as a result of a long history of involvement with the Village of Sauget sewer system, both directly for the Village itself, for clients connected to the sewer system, and agencies that had a interest in the sewer system.

Some of the clients and assignments we performed are listed below.

1. In 1943 Horner & Shifrin was retained by the Lewin Metals Corporation (predecessor of Cerro Copper Products Company) to design a connection to a Village sewer from an existing sewer discharging to the Dead Creek Surge Pond.

2. In 1948, a report on the Village Sewer System was prepared for the Village of Monsanto (original name of the Village of Sauget). This report has been lost and has not been available for this investigation.

3. In 1952, a study entitled Report on Existing Sewerage System was prepared for the Village of Monsanto. This report included a recommendation for expansion of the pumping station at the lower end of the system that discharges wastewater into the Mississippi River during high river stages.

4. Another assignment in 1952 for the Village of Monsanto included preparation of design plans for expanding the pumping station at the Mississippi River from 82 cfs to a 167 cfs and preparation of design plans for two 36-inch sewer lines to the new pumping station. This work was done in conjunction with Architectural-Engineers, Inc.

5. In 1953, a small sewage pump station was designed for the sewer on Little Avenue. The client was the Village of Monsanto.

6. In 1959, a Study of Pollution Abatement for The East Side Levee and Sanitary District was prepared. This study included the Village of Monsanto. Of particular interest for the current investigation are the measurements of the flow in the Village of Monsanto outfall sewer made as a part of that Study.

7. In 1964, the Village of Monsanto retained Homer & Shifrin to prepare a report which was entitled Development of Plan of Relief for Sewer System. The purpose of the Study was to develop a comprehensive plan of relief for the existing sewer system of the Village.

8. In 1965, the Village of Monsanto retained Homer & Shifrin to design the Dead Creek Pumping Station and Interceptor which were to collect and discharge to the Village Sewer System the wastewater from the Cerro Copper Products Company (then called Cerro Corporation) that at that time was being discharged to the Dead Creek Surge Pond.

9. In 1976, Homer & Shifrin personnel designed the 36-inch D Street Sewer for the Monsanto Company. This sewer connected to the 36-inch Village sewer at a manhole identified as Manhole 2-U by the Monsanto Company. This manhole is just east of Manhole 24.

10. The Village of Sauget retained Horner & Shifrin to assist them in their industrial waste control program from 1988 to 1991. This involved acting as the Pretreatment Coordinator for the American Bottoms Regional Wastewater Treatment Plant.

11. The Village of Sauget retained Horner & Shifrin in 1992 to prepare Plans and Specifications of an outfall sewer extension and multiport diffusion system for the American Bottoms Region Wastewater Treatment Plant.

In conjunction with carrying out the various assignments listed above, we obtained a variety of information to assist us. Much of this information remains in our files. This information included reports prepared by other engineering organizations and information from the individual companies utilizing the Village Sewer System. Of particular interest to us as we made this investigation were the Reports done in 1962 by Jos. W. Goldenberg, Consulting Engineer, who prepared a Report Upon Separation of Sewers in the Village of Monsanto and a series of Reports prepared by the Monsanto Company in 1962 and 1963 which analyzed the Village of Monsanto sewer system. These reports are in our files because they were utilized in the preparation of the report prepared by Horner & Shifrin in 1964 previously listed above.

The writer of this report had a major part in the preparation of the 1964 Horner & Shifrin Report, and was the project engineer for the 1965 design of the Dead Creek Pumping Station and Interceptor.

The Village Sewer System

The Village Sewer System has been a frequently changing system to accommodate the growth and needs of the industries located in the Village. Based on information in our files, and additional information provided to us during the course of this assignment, we have been able to generally reconstruct the growth of the system so that we could investigate the use of Dead Creek as a surge pond as these changes occurred. Unless otherwise identified, numbers used to identify manholes of the Village Sewer System are those assigned to them

in the 1952 Horner & Shifrin Report and used in subsequent reports by Goldenberg, Monsanto Company (1962) & Horner & Shifrin.

In 1932 an extensive system of sewers was designed by B.C. McCurdy, Consulting Engineers. These are the first public sewers that we have a record of in the Village which was incorporated in 1926. Apparently, prior to that time, development in the area was served by sewers constructed by the individual industries and by residents of the area.

The major sewers designed in 1932 which were constructed during that year and 1933, are shown on Attachment A at the back of this Report.

In 1942 major improvements were made to the Village system. These improvements consisted of building a new pumping station at the levee, a new outfall from this pumping station to the river, and an additional 36-inch line from the pumping station eastward to a manhole now identified as Manhole 2. Other significant improvements were made in 1945. By this time a 36-inch sewer, originally used as a culvert under the Alton and Southern Railroad tracks, had been connected to Manhole No. 24 and was used as an overflow to Dead Creek. It is not clear from our information when the portion of Dead Creek south of the Alton and Southern Railroad had been blocked so that it would serve as a surge pond for this overflow but it was accomplishing this function by 1943. Attachment B at the back of this report shows the general outlines of the system as we understand it existed in 1945.

In 1948 and 1951, more additions were constructed to the Village Sewer System to significantly increase the capacity of the sewer system to transport wastewater from the southern portion of the Village. Data available confirms that the 36-inch pipe under the Alton and Southern Railroad served as an overflow and that a surge pond along 19th Street also was in use to store peak flows the sewer system could not handle. This is the basic system that existed when Horner & Shifrin analyzed the sewer system and made recommendations for more improvements in the 1952 Report on Existing Sewerage System. This system of sewers is shown on Attachment C at the back of this Report.

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As a result of recommendations in the 1952 Report, the Pumping Station at the Mississippi River was essentially doubled in capacity and two additional 36-inch lines from the Pump Station to Manhole 2 were constructed in 1953, as well as some other minor sewer extensions. The improvements constructed were only a few of the recommended improvements in the 1952 Report.

No significant additional improvements were made to the sewer system between 1953 and 1965. From 1962 through 1965, three major reports were prepared to consider future improvements to the system. In March of 1962 Jos. W. Goldenberg, Consulting Engineers, made a study entitled Report Upon Separation of Sewers in the Village of Monsanto. This Study was prepared for the Monsanto Chemical Company. In December of 1962, the engineering staff of the Organic Chemicals Division, of Monsanto Chemical Company issued Report No. 5 of Job EA No. 4-276. The stated purpose of this Report was: "To determine the adequacy of the existing Monsanto Village sewers, and where additional sewers should be located, if and when they are required..." In 1964 Horner & Shifrin was retained to prepare a report for the Village of Monsanto entitled Development of Plan of Relief for Sewer System. The major components of the sewer system as existing when these three reports were being prepared is shown as Attachment D at the back of this Report except that, in addition, the Dead Creek Pumping Station and Interceptor that were constructed in 1966 as a result of the recommendations of the 1964 Horner & Shifrin Report are also shown.

After 1966, we are aware of no substantial changes to the Village Sewer System that were made for over fifteen years. Some changes to the various industrial sewers to make it possible to measure and sample the wastewater discharge from their plants are believed to have been made and there is information indicating that the Dead Creek Surge Pond was reduced in length by blocking the culvert under Queeny Avenue around 1968 or 1969. Also during this fifteen year period, Federal and State laws required that the wastewater discharged from the Village Sewer System be treated. This resulted in major construction for wastewater treatment facilities.

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The construction of the treatment plants had an important effect on the Village Sewer System. The cost for treating wastewater and the need to control the quality of the wastewater discharged to the sewer system made it desirable and/or necessary for the industries to reduce the process wastewater they produced and discharged to the sewers.

The first treatment plant was constructed in 1967. In 1977 this plant was upgraded to meet more stringent effluent requirements including providing some treatment for stormwater. In 1987 a Regional Treatment Facility was constructed. The treated wastewater from the Village of Sauget treatment plant was required to be discharged to this facility to receive additional treatment before being discharged to the Mississippi River.

During 1984, the Monsanto Company planned to construct a 42-inch sewer to parallel the Village sewers from Manhole 19 to Manhole 26. This new sewer was designed to receive almost all of the Monsanto Company's wastewater that previously was discharged to the Village sewers in this location. The new Monsanto Company 42-inch sewer significantly increased the capacity of the Village sewers for the remaining industrial and residential flows to be discharged to them between Manhole 10 and Manhole 26.

During 1990, the Dead Creek Surge Pond north of Queeny Avenue was filled in and no longer was available to receive and/or store wastewater and/or stormwater. Cerro Copper Products Company constructed a stormwater detention basin to receive stormwater from their plant at this time.

Investigation of Potential Overflow to Dead Creek Surge Pond from 24-Inch Village Sewer at Manhole 24

Period from 1953 thru 1965

A substantial amount of data is available on the Village Sewer System during this period of time. Because of this, there is the opportunity to investigate in detail the operation of the

sewer system and when overflows could, and would have occurred to the Dead Creek Surge Pond via the 36-inch overflow pipe under the Alton and Southern Railroad tracks.

As indicated above, during this time the configuration of the sewer system, as shown on Attachment D, remained relatively constant. Data in the various reports available document the wastewater and stormwater flows discharged to the sewer system from the various industries and the residential area did not vary substantially between 1960 and 1964. It seems reasonable to assume that this was essentially true for the entire time period.

The 1962 Monsanto Chemical Company Report analyzed the Village Sewer System under a variety of flow conditions, one of which was considered to be the existing average dry weather flow (55.3 cfs). Other reports analyzed the system under dry weather flow but for projected future peak flows rather than existing flows. Since the Monsanto Report used existing dry weather flow, this analysis is particularly helpful and is discussed below.

This Monsanto Company analysis concluded that the 24-inch Village sewer at the junction with the 36-inch overflow to Dead Creek (Manhole 24) would not discharge to Dead Creek during average dry weather flow but that the water surface would be right at the elevation where discharge to Dead Creek could start. The flows used in this analysis were consistent with the average weekday flow measurements as reported in the 1959 Horner & Shifrin report (36.2 mgd or 56.0 cfs) prepared for The East Side Levee and Sanitary District but not the peak dry weather flows that were recorded. These measured peak dry weather flows (39.2 mgd or 60.6 cfs) recorded by Horner & Shifrin were approximately 10% higher than the average flow.

The basis of the hydraulic computations, i.e., the "n" value for pipe frictional computations used in the Monsanto Company Report, was questioned by Metcalf & Eddy, Engineers, in a Report for the Village of Monsanto dated March 5, 1965 entitled Conveying of Storm and Waste Water from the existing Village Pumping Station to the Proposed Corps of Engineers Pumping Station. Metcalf and Eddy expressed the opinion that the value used in the Monsanto Company Report resulted in calculating too little friction in the sewer system.

Based on Metcalf & Eddy's evaluation, the hydraulic gradient would be between two feet and three feet higher at Manhole 24 than indicated in the Monsanto Company Report. This increase would make it possible for dry weather wastewater from Manhole 24 to overflow to Dead Creek.

Flow measurement made by Rickman, Egerly, Burbank & Associates in 1962 provided data that seems to confirm the Metcalf & Eddy evaluation that pipe friction calculated in the Monsanto Report was too small. Hydraulic gradients at Manhole 19, with flows in the 24-inch and 30-inch sewers comparable to those used in the Monsanto Company Report, indicated the measured hydraulic gradient in the 24-inch sewer was higher than calculated in the Report by 10-inches to 12 inches. Part of the increased hydraulic gradient in the 24-inch sewer was due to the split in flow between the 30-inch sewer and the 24-inch sewer.

Computations made during the course of this investigation also confirmed the conclusions expressed in the Metcalf and Eddy Report. These computations indicate a calculated depth at Manhole 24 that is 12 inches higher for the same flows used by the Monsanto Co.

On November 8, 1965 during a period without substantial rainfall in the area, the hydraulic gradient in Manhole 24 was measured by Horner & Shifrin personnel to be 24-inches above the bottom (invert) of the 36-inch sewer to Dead Creek. This hydraulic gradient was thought by Monsanto Company to be caused by deposits in the 24-inch Village sewer and that cleaning the sewer would lower the hydraulic level at Manhole 24. Whatever the reason for the observed condition, this demonstrates that the water surface actually attained an elevation in the Village sewer during dry weather that could cause overflow to Dead Creek through the 36-inch sewer.

Finally, in a letter dated November 13, 1964 from Mr. Silverstein of Cerro Corporation to Mr. Goldenberg, Mr. Silverstein stated, "Dead Creek has been used for ponding and surge storage for a number of years and the vast majority of the time the level of Dead Creek is very close to the top of the 36-inch conduit which connects it with the Village sewers...."

In order for flow to go from Manhole 24 through the 36-inch overflow into the Dead Creek Surge Pond, two conditions must occur:

1) The hydraulic gradient (water surface level) in Manhole 24 must be above the highest point of the bottom (invert) of the 36-inch pipe; and

2) The water level in the Dead Creek Surge Pond must be below the hydraulic gradient in Manhole 24.

During the time period being considered , under average dry weather flow, some of the wastewater from the Cerro Copper Products plant was entering the Dead Creek Surge Pond and flowing into the Village Sewer System through the 36-inch pipe from the Dead Creek Surge Pond to Manhole 24. A flow of 2.6 cfs from Cerro Copper Products is the value used by Monsanto Company and we concur is an appropriate value to use.

An investigation was made to determine what the water level would have to be in the Dead Creek Surge Pond to allow this 2.6 cfs of Cerro flow to enter the 36-inch sewer. Two different conditions were investigated:

1. Assuming the water level in Manhole 24 is 10.5 inches higher than the invert elevation of the 36-inch overflow at Manhole 24 (6 inches above the invert elevation of the 36" overflow in the south end).

2. Assuming the water level in Manhole 24 is 13.5 inches higher than the invert elevation of the 36-inch overflow at Manhole 24 (9 inches above the invert elevation of the 36-inch overflow on the south end).

The Hydro Calc Circular Channel Analysis Computer Program Version 1.5 by Dodson and Associates was used for the computations.

Condition 1 assumes the water level in Manhole 24 is about 6 inches higher than computed in the Monsanto Company Report. Condition 2 assumes the water level is 9 inches higher than computed in the Monsanto Company Report.

Under Condition 1, the water level in the Dead Creek Surge Pond would have to be about 3 inches higher than the water level in Manhole 24 to allow the 2.6 cfs flow form Cerro to enter Manhole 24.

Under Condition 2, the water level in the Dead Creek Surge Pond would have to be only about 1 inch higher than the water level in Manhole 24 to allow the 2.6 cfs flow from Cerro to enter Manhole 24.

Under these conditions, even a minor increase in the flow to the Village system of 3% or less would make the wastewater hydraulic gradient (water level) in Manhole 24 rise above the elevation in the Dead Creek Surge Pond and the direction of the flow would reverse and go from Manhole 24 to the surge pond. The rate of flow into the Dead Creek Surge Pond would depend on how high the water level in Manhole 24 got in relation to the water level in the surge pond.

It should be noted that if the hydraulic grade in Manhole 24 constantly stayed at a high elevation, e.g., the elevation noted on November 8, 1965, the flow out of Manhole 24 and the Cerro plant flow into the Dead Creek Surge Pond would raise the water level in the surge pond until eventually the flow from Manhole 24 would stop and the flow from the Dead Creek Surge Pond would again start entering the 36-inch pipe.

Based on the above information, it is clear that during the time period from 1953 to 1965 conditions could and did exist for dry weather flow from the Village sewer at Manhole 24 to enter the Dead Creek Surge Pond from time to time. Although conditions could exist at any time for this to happen, one obvious scenario would be for the water surface in Manhole 24 to be 9 inches or more above the high point of the invert elevation of the 36-inch pipe into the Dead Creek Surge Pond due to normal dry weather flow into the Village Sewer System.

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The level in the Dead Creek Surge Pond would be about 1 inch higher to allow the flow from the Cerro plant to flow through the 36-inch sewer to the Village Sewer. During the weekend when the records indicate the flow discharged into the Village system would decrease, the water level in Manhole 24 would drop by about 12 inches. With this change, the stored liquid in the Dead Creek Surge Pond would start to enter the Village sewer and the water level in the Dead Creek Surge Pond would drop. On the following Monday when the flow increased in the Village Sewer System, the water level in Manhole 24 would rise again and flow would go from Manhole 24 to the Dead Creek Surge Pond. As the level in the Dead Creek Surge Pond increased due to the flow entering it, the flow out of the Village Sewer System would decrease and eventually stop and then reverse to let flow from Cerro again enter into Manhole 24.

A change from average flow in the Village Sewer System to a period of normal daily peak flow could also cause the hydraulic grade in Manhole 24 to rise sufficiently to cause the flow in the 36-inch pipe to reverse and discharge into the Dead Creek Surge Pond during the peak flow occurrence.

During periods of rainy weather, stormwater entered the sewer system. The rate of stormwater entering the Village sewers would depend on the amount of rain that occurred and the ability of the sewers to accept the additional flow over and above the dry weather flow it carried. Every study of the Village Sewer System we reviewed recognized that the system was inadequate for handling runoff from even moderate rainfall events without the use of surge ponds.

Normally, analyses are made for sewers serving this type of industrial area on the basis of a rainfall event that would occur on an average once every five years. The 1952 and 1964 Homer & Shifrin Reports and the 1962 Goldenberg Report used this criteria. Other factors for design include the area that would drain to the sewer and the imperviousness (character of the surfaces) of the area, and the time for the peak flow to occur. These factors result in a "PI" (also called "CI") value that indicates the amount of stormwater runoff from a specific

area. It is expressed in cubic feet per second per acre. The larger the value, the greater the rate of runoff.

In the 1962 Monsanto Company Report, they developed data for different rainfall/runoff conditions. Although the hydraulic computations of this Report are subject to the questionable "n" factor used as discussed previously, it is of interest to note that for one condition that was studied, a "Ci" factor of 0.5 was used and it was concluded that "Dead Creek would receive a flow of 17 cfs from the south area with the water level reaching elevation 400.8 in 180 minutes". For a second condition a "Ci" factor of 0.75 was used and it was concluded, "The south sewers discharge 39.5 cfs to Dead Creek where the water level will reach elevation 399.6 in 45 minutes". For a third condition a "Ci" factor of 1.0 was used and it was concluded, "The south sewers are adequate, with a discharge of 54 cfs to Dead Creek where the water level reaches 399.8 in 45 minutes". Neither Horner & Shifrin nor Goldenberg agreed that the "Ci" factors used by Monsanto Company in their Report represented large enough rates of stormwater runoff to be classified as a once in 5 year event; however, this Report does clearly show that during rainfall events, flow would enter the Dead Creek Surge Pond from Manhole 24. Some of the differences in the Horner & Shifrin and Monsanto Company evaluation of the appropriate "Ci" factor to use is discussed on page 9 of the 1964 Horner & Shifrin Report.

The significant use of Dead Creek as a surge pond was expressed in the 1964 Horner & Shifrin Report (page 12) which stated, "Should the surge ponds no longer be permitted to receive polluted wastewater, yet maintaining the existing combined sewer system, all of the main sewers would require extensive supplementation. The most grossly overloaded section would be that through the Monsanto Company property between Mississippi Avenue and the north end of the Dead Creek channel".

To obtain a perspective of how often rainfall events would cause overflow into the Dead Creek Surge Pond, the measurements of flow made in 1959 for The East Side Levee and Sanitary District Report are helpful. During six weeks of measurement in the fall of 1958, precipitation occurred on 9 days. On the three days of greatest rainfall the total precipitation

did not exceed 1-inch for the entire day. (For comparison, a 1 Year Frequency storm of only 1 hour duration would have 1.35 inches or a 1 Year Frequency storm of 6 hour duration would have 2.12 inches. See Technical Paper No. 40 of US Weather Bureau). The effect of the precipitation can be identified by substantial increased flow in the sewers. On all three days the flow peaked at rates over 77 cfs (50 mgd) and once over 91 cfs (59 mgd). These rates of flow clearly would cause overflow into the Dead Creek Surge Pond considering that the system would only handle around 55 cfs without overflow as illustrated in the discussion of the dry weather flow conditions. Obviously, an overflow into the Dead Creek Surge Pond from Manhole 24 occurred many times in a year during the occurrence of rainfall. This conclusion is in full accord with the statement in the 1964 Horner & Shifrin Report (page 2). "Almost all of the system is surcharged during periods of moderate rainfall runoff and would be completely inadequate if two surge ponds were not presently available for the temporary storage of that portion of the flow which cannot be accommodated by the sewers".

It is appropriate to note that during the early 1960's, the Monsanto Company was very insistent that Dead Creek continue to be used as a surge pond to receive excess flows that the Village Sewer System could not handle during peak flows.

The Monsanto Company Report of December 1962 stated, "2. Elimination of Dead Creek and 19th Street pond facilities would require the addition of at least two new 60-inch sewers to carry storm runoff. It is not recommended that this be done at the present time".

After the completion of the 1964 Horner & Shifrin Report, the discussion of the recommendations of the Horner & Shifrin Report to eliminate Dead Creek as a surge pond for polluted wastewater indicated opposition from the Monsanto Company. In the minutes of a meeting of the Village industrial representative on June 8, 1965, it is stated, "Because of the general opposition of those present other than Stutz & Hodges *(Monsanto Company representatives)* to the Monsanto recommendation for the use of surge ponds, it was proposed that the plant managers of the Village industries meet and see if a Village sewer policy can be formulated".

The minutes of a second meeting on June 14, 1965 indicate the firm commitment Monsanto Company representatives had to the concept that Dead Creek remain in use as a surge pond. One of five Monsanto Company proposals that were presented as an effort "to break the deadlock" was: "(4) Provide an additional relief line from the Village sewers at the south end of the Monsanto Plant under the A&S tracks into Dead Creek..."

Cerro Corporation was in opposition to the policy of using Dead Creek as a surge pond. Mr. Silverstein of Cerro Corporation stated in a letter dated November 23, 1964 to Mr. Goldenberg, "We therefore believe that any changes or modifications of the present (Village) waste disposal system should be taken in steps towards a direction that will eliminate the obnoxious environment of Dead Creek rather than contributing to it". The minutes of the two meetings of industrial representatives in June of 1965 reiterated the position of Cerro that Dead Creek should not be used as a surge pond. The minutes of the June 14, 1965 meeting record the following, "S. Silverstein restated Cerro's position that they believe the Village would have to eventually cease ponding of polluted wastes".

Period from 1966 to 1984

In 1966, the Dead Creek Pumping Station and Interceptor were constructed. These facilities were designed to remove Cerro Corporation's wastewater from the Dead Creek Surge Pond and discharge it into the 36-inch sewer going under the Alton & Southern Railroad tracks. Originally, it was the design concept to pipe the wastewater under the railroad tracks to a sewer on the north side of the railroad tracks. The design was modified at the request of the Monsanto Company. (See letter dated November 10, 1965 from George Sellwasser of Horner & Shifrin to Joseph Goldenberg.) The connection to the 36-inch overflow line was designed to allow the overflow of wastewater from Manhole 24 to Dead Creek to continue but the elevation that the overflow could start was raised 10 inches.

About this time (1966), the various industries started to implement process changes that reduced the quantity of wastewater discharge to the Village Sewer System. The impetus for this was the requirement for wastewater treatment of the flow from the Village outfall. For

example, the Monsanto Company average dry weather flow to Manhole 19 in 1962 was listed as 31.6 cfs or 14,000 gpm. In 1972, the total flow from Monsanto Company was reported to be "slightly more than 7,000 gpm" and as of January 1, 1975, "...flow reduction projects were completed...reducing the total plant flow to 4,870 gpm." The data quoted is from Appendix A of a 1974 Year-End Status Report dated February 6, 1975 by M.R. Foreman of the Monsanto Company (CER 106705).

In 1970 Biodize System, Inc. was retained by the Village to measure and sample the flows from the various industries for the purpose of distributing the operating costs of the Village Treatment Plan among the various contributors. This report, dated December 1970, indicated that the total average wastewater flow was 23.836 mgd (36.8 cfs). In a report entitled Addendum to Facilities Plan and Infiltration - Inflow Analysis (Table 3, page 16) by P.H. Weis & Associates, Inc. and Rhutasel & Associates, Inc. dated February 1984, the average day dry weather flow to the Village treatment plant for 1983 was reported to be 8.33 mgd (12.9 cfs).

Because of the reduced dry weather flows discharged to the Village sewers, the Village Sewer System would have had capacity to discharge the dry weather flow without any expectation of a discharge to the Dead Creek Surge Pond. This assumes the sewer lines between the pumping station at the river and Manhole 24 were capable of operating at essentially their original capacity. The decreased dry weather flow also provided more capability for the transportation of stormwater flows before overloading the sewers to the extent that flow from Manhole 24 would discharge to the Dead Creek Surge Pond. This increased capacity available for stormwater flow would reduce the number of wet weather overflows into Dead Creek.

In 1981 when repairs to a manhole near Route 3 were necessary, P.H. Weis & Associates studied the effect of needing to close off one of the two sewers downstream of Manhole 21 to accomplish the repairs. There was a discussion about the capacity of one sewer to handle stormwater flows. In a letter report dated June 25, 1981 (CER 099669), Paul Weis wrote that whether one or two sewers was operating would have essentially no effect during a 20-year rainfall event since with both sewers operating with a hydraulic grade just at the overflow level

to Dead Creek, the stormwater runoff would be 10 times the capacity of the sewer. Based on this computation by Mr. Weis, it is obvious that a 1-year rainfall event, which would produce approximately 40% of the runoff of a 20-year event, would produce a stormwater runoff essentially four times the capacity of the two sewers (even without any dry weather flow) and therefore, there would be an overflow to the Dead Creek Surge Pond to take some of the excess flow.

Reviewing the data from the 1959 flow measurement previously mentioned, indicates that on the three days when rainfall caused significant increases in flow, the increased flow due to stormwater was 17 mgd (26 cfs), 20 mgd (31 cfs), and 31 mgd (48 cfs). It appears that the two smaller rainfall events might have been able to be transported by the Village Sewer System, but that the third rainfall event would have caused an overflow into the Dead Creek Surge Pond. This assumes no material change in the stormwater directed into the Village sewer between 1959 and 1981.

The data available indicates that during the period from 1966 to 1984, the occasions of overflow to Dead Creek decreased. Dry weather overflows into Dead Creek may have occurred during the first year or two, but by 1970 and thereafter, no overflows from Manhole 24 appear to have occurred during dry weather as long as the sewer system was functioning properly. During the 1982 flood season (which was a record flood at the time) the sewer system did experience substantial damage, but there is no information available to us to indicate that the sewers failed to function to adequately conduct the dry weather flow to the treatment plant or that any dry weather flow overflowed to the Dead Creek Surge Pond.

It is clear that the stormwater flows that resulted from even moderate rainfall continued to produced flows that the Village Sewer System could not handle without overflows from Manhole 24 to the Dead Creek Surge Pond. The frequency of overflows would have decreased over this time period due to the capability of the sewer system to receive more stormwater because the dry weather flow had decreased substantially. The deterioration of the sewer system during and after 1982 may have increased the occasion of overflow during

rainfall because of decreased sewer capacity due to the damage sustained by the sewers in the 1982 flood.

Period from 1985 to 1990

During this period of time, Monsanto Company constructed a 42-inch sewer to parallel the Village sewers from Manhole 10 to Manhole 28. During 1990, the Dead Creek Surge Pond was filled in and was no longer available to receive overflows from Manhole 24.

Little information is available to us about this time period, but after the 42-inch sewer was constructed by Monsanto, overflows to the Dead Creek Surge Pond were likely to occur only during significant rainfall events.

Information that during rainfall events overflows to the Dead Creek Surge Pond did occur as late as 1990 is provided from the records of the Korte-Plocher Construction Company. On June 6, 1990 and again on August 15, 1990, while constructing the stormwater detention facility for Cerro Company, the Superintendent recorded on his Daily Job Report that "water from Monsanto" was coming into his work area for the Cerro project after rain started falling.

Period Prior to 1953

Not a lot of detailed information is available during this period but we have included the following information we do have to cover the entire period that the Village Sewer System existed as well as some time before this.

The 36-inch line under the Alton and Southern Railroad track was constructed in 1924 or 1925 to replace a trestle for the tracks across Dead Creek. Dead Creek was originally a free flowing drainage ditch flowing from north to south. It terminated in Cahokia Chute, a small channel of the Mississippi River around Arsenal Island. It extended northward into the City of East St. Louis and beyond. The Railroad installed the pipe, but by agreement with Monsanto

Company, the elevation of the new 36-inch pipe was placed below the bottom of Dead Creek to allow the existing Monsanto sewer pipe upstream to drain through the Railroad's 36-inch pipe.

By the early 1930's Dead Creek had been filled in south of Monsanto Avenue and buildings of the Monsanto Company erected on the fill. The 36-inch line under the Alton and Southern Railroad track provided for drainage of stormwater from the area between Monsanto Avenue and the Alton and Southern track to continue to drain southward through Dead Creek. Since there are no records of sewers in the area prior to 1932, it seems likely that before the Village Sewer System was constructed, the industries located along Dead Creek south of Monsanto Avenue discharged wastewater flows into Dead Creek to drain to the Mississippi River.

The Village Sewer System design by B.C. McCurdy in 1932, shown in Attachment A, did not show any connection between the existing 36-inch pipe and the proposed Village Sewer System, although an 18-inch sewer from Mississippi Avenue to Dead Creek was designed and constructed just south of what is now Queeny Avenue and labeled as an overflow line. No detailed information is available on how the industrial sewers were connected to the Village system after it was constructed, but it is apparent that stormwater runoff, with or without being mixed with the industrial wastewater being produced in the area, had to be discharged to Dead Creek because of the inadequacy of the Village sewers to receive any substantial amount of stormwater runoff. In the custom of this time and place, the industrial wastewater and stormwater runoff frequently discharged to a single system of sewers with some provision for the sewers to discharge some of the combined wastewater and stormwater to drainage ditches during wet weather when stormwater flows occurred. It seems likely that industrial wastes were allowed to discharge to Dead Creek from time to time.

In 1935 a drawing of the Village Sewer System was prepared to indicate the capacity of the various Village sewer lines. This map does not show the 36-inch sewer under the railroad tracks or give any indications of an overflow from the 24-inch sewer Village line to Dead Creek.

9 6 0 6 5 0 0 2 1 5 7

The earliest indication available to us that the Village sewers were connected to the 36-inch line to Dead Creek is 1943. A survey had been made for an extension of a Lewin Metals Corporation (now Cerro Copper Products Company) sewer to connect it to the Village Sewer System east of Dead Creek, just south of the Alton and Southern Railroad. This survey shows the water surface in Dead Creek to be identical with the hydraulic gradient in the Village sewers, indicating that the two were connected. Subsequent to this, numerous drawings are available which shows the connection between the two. This information is consistent with the fact that in 1939 the Alton and Southern Railroad granted the Village permission to extend the original 36-inch pipe under the railroad tracks northward to connect to the 24-inch Village sewer.

The portion of Dead Creek between the Alton & Southern Railroad tracks south to Judith Lane was converted to a pond by blocking the flow under Judith Lane. When this was done has not been determined but by 1943 the Creek bed was accomplishing this because the water level in Dead Creek was approximately 2 feet higher than the culverts that otherwise would allow Dead Creek to drain to the south. The blockage at Judith Lane may have been accomplished at the same time the 36-inch line under the Railroad tracks was connected to the Village Sewer System.

We are not aware of any detailed information about dry weather flow during this period. The 1952 Horner & Shifrin Report discusses dry weather flows but only in the context of future flows to be used for design of additions to the sewer system in contrast to existing dry weather flows.

The 1943 survey indicates that the level in Dead Creek was 2 feet above the invert elevation of the 36-inch sewer. This indicates that this part of Dead Creek was serving as a surge pond for dry weather flow at this time. The multiple additions (1942, 1945, 1948 and 1951) to the original sewer system built in 1932 indicate that the system was not adequate for the growing use of the system. The extent to which Dead Creek operated as a surge pond during dry weather flows can only be a speculation with the information we have, but it seems evident that it did. This would be the explanation for the decision to convert the 36-

inch line under the Alton and Southern Railroad from a culvert to handle stormwater in Dead Creek to an overflow line for the 24" Village Sewer.

After the 36-inch line under the railroad tracks was connected to the Village Sewer System there was no outlet for stormwater north of the tracks to be drained out of the area except through the Village Sewer System. Since the 24-inch sewer could not begin to provide adequate capacity for this, any significant stormwater flow entering the original 24-inch Village sewer, even after being supplemented by the 30-inch sewer in 1945, would have had to overflow at Manhole 24, through the 36-inch line into Dead Creek.

The 1952 Horner & Shifrin Report stated that the then existing Village Sewer System was capable of discharging 76 cfs to the Pumping Station at the river. This analysis was based on allowing the water level in Manhole 25 to rise to a level more than 5 feet above the top of the 24-inch sewer. This elevation would only be attainable if the 36-inch overflow to the Dead Creek Surge Pond were not available. (The premise of the Horner & Shifrin analysis and recommendations was that there would be no connection from the Village Sewer System to Dead Creek.) Since the overflow was in existence and had been for at least 9 years, a flow of 76 cfs into the Village Sewer System would cause an overflow into the Dead Creek Surge Pond from Manhole 24. It was estimated that the amount of stormwater reaching the Village sewers at that time as a result of a 5-year frequency storm was 100 cfs (page 7). Based on this data, a 1-year frequency storm would produce on the order of 60 cfs of stormwater runoff. A flow of less than 50 cfs would cause the hydraulic gradient at Manhole 24 to be about 1 foot above the bottom of the 36" overflow to the Dead Creek Surge Pond and therefore could allow an overflow to Dead Creek Surge Pond.

From the above data, it is obvious that prior to 1952 there had been overflows into Dead Creek during wet weather.

It is our conclusion from the information available that prior to 1932, wastewater from the industries in the Village along Dead Creek discharged these wastes to Dead Creek and flowed southward eventually reaching the Mississippi River. After the Village Sewer System

was constructed in 1932 and the connection made to the 36-inch pipe under the railroad track around 1939, it is reasonable to assume that there were times when the dry weather wastewater flow entered Dead Creek which was blocked to create a surge pond. The water level of Dead Creek shown on the survey made in 1943 indicates this, but no specific data confirms it. The repeated expansion of the system confirms there was a need to increase the capacity of the sewer system, but not necessarily to handle the dry weather flow.

Stormwater flow mixed with industrial wastewater would have entered Dead Creek during the period from prior to the construction of the Village Sewer System through 1952. The need to expand the system repeatedly certainly indicates this. During and immediately prior to 1952, the data available validates this conclusion for that specific period of time.

Summary of Conclusions

History of Dead Creek within the Village of Sauget

Dead Creek originally was a free flowing creek originating north of the Village of Sauget, flowing southward through the Village and continuing flowing generally southward about 5 miles to discharge into the Mississippi River at Arsenal Island.

In 1924 or 1925 a 36-inch culvert was installed under the Alton and Southern Railroad tracks to replace a wooden trestle. The Monsanto Company entered into an agreement with the Alton and Southern to install this new culvert below what was then the bottom of Dead Creek so that a sewer from the Monsanto Company into Dead Creek could drain through the new culvert. The change from a trestle to the 36-inch pipe which had much less capacity probably was due to the fact that part of Dead Creek north of the Alton and Southern tracks was filled in and the drainage that had gone to Dead Creek from north of Monsanto Avenue no longer entered Dead Creek. This was certainly the condition by the early 1930's at which time the Dead Creek channel had been filled in for about 1,000 feet south of Monsanto Avenue and used by the Monsanto Company for building sites.

After 1939, or shortly thereafter, when the 36-inch pipe under the Alton and Southern tracks was connected to the Village Sewer System at Manhole 24, all drainage due to rainfall from north of the tracks was eliminated from flowing southward under the tracks, except what entered the Village Sewer System and overflowed through the 36-inch pipe under the tracks.

At some time not know exactly, Dead Creek south of the Alton and Southern tracks was blocked at Judith Lane. It would seem reasonable this would have been done in 1939 when the 36-inch pipe under the railroad was connected to the Village Sewer System. By 1943 this part of Dead Creek was acting as a pond with a connection to the Village Sewer System which controlled the water level in the pond.

Sometime in the middle or late 1960's the pipe under Queeny Avenue was plugged which reduced the length of the pond that was connected to the Village Sewer System. In 1990 the channel of Dead Creek between the Alton and Southern Railroad and Queeny Avenue was filled in as part of the clean-up of Dead Creek known as Hazardous Waste Site CS-A.

Wastewater Discharges to Dead Creek and Dead Creek Surge Pond within the Village of Sauget During Dry Weather

Prior to the construction of the initial Village Sewer System in 1932 and 1933, industries in the Village along the channel of Dead Creek discharged their wastewater into Dead Creek. No information is available about sewage from homes in the area. After the Village Sewer System was constructed, both the industrial and residential wastewater were discharged to this sewer system except for Lewin Mathes Company (a predecessor company to Cerro Copper Products Company) which continued to discharge some of its wastewater to Dead Creek. Some other industries south of the Alton and Southern Railroad may also have discharged some wastewater to Dead Creek. Prior to 1939 all wastewater discharges to Dead Creek would have flowed southward to the Mississippi River. No information is available on whether or not any wastewater from the industries connected to the sewer system entered Dead Creek at this time during dry weather due to inadequate capacity of the Village Sewer System.

By 1943, after the 36-inch pipe under the Alton and Southern Railroad was connected to the Village Sewer System and the Dead Creek channel was acting as a pond, it served as a surge pond for the Village Sewer System as well as a channel to conduct into the Village Sewer System wastes discharged directly into it. There is no detailed information available about dry weather flow to document what happened between 1939 and 1952. Since the Village Sewer System also changed frequently, the circumstances for creating overflows into the Dead Creek Surge Pond would have varied during this time. For these reasons, we cannot reconstruct what happened with regard to dry weather overflows to the Dead Creek Surge Pond during this period.

During the period from 1959 to 1965 substantial information is available. Furthermore, the Village Sewer System remained essentially unchanged. The data clearly indicates that Dead Creek served as a surge pond for overflows from the Village Sewer System via the 36-inch sewer under the Alton and Southern Railroad between Manhole 24 and the Dead Creek Surge Pond. Both hydraulic computations and actual observations substantiates this statement. Some wastewater from the Cerro plant continued to be discharged to the Dead Creek Surge Pond.

The Dead Creek Surge Pond was overtly considered a part of the Village Sewer System.

In 1966 the direct discharge of wastewater by Cerro Corporation into the Dead Creek Surge Pond was eliminated by the construction of the Dead Creek Interceptor and Pump Station. The overflow from the Village Sewer System, which then would have included the wastewater from Cerro that previously had been discharged directly to Dead Creek, would have continued to enter the Dead Creek Surge Pond from time to time due to a variety of circumstances. These dry weather overflows would have decreased in number after 1966 because the dry weather flow to the Village Sewer System started to decreased around 1967 from about 55 cfs to 36.8 cfs in 1970 and 12.9 cfs in 1984. It seems reasonable to assume that after 1970 no dry weather flows entered the Dead Creek Surge Pond except under unusual conditions., e.g., unusually large flows or maintenance of the sewer system. By 1990 the surge pond had been filled.

Information on Wastewater Discharges to Dead Creek and Dead Creek Surge Pond within the Village of Sauget During Wet Weather

Prior to the construction of the initial Village Sewer System in 1932 and 1933, all industrial wastes from industries along the channel of Dead Creek were discharged to Dead Creek in both wet weather as well as dry weather. After 1932 and up to 1939 no specific information is available but probably industrial wastes and rainfall runoff were collected in the same sewer system within the boundaries of the various industries. Since the Village Sewer System did not have capacity for much, if any, rainfall runoff, the industrial sewers would have had to overflow to Dead Creek during wet weather. These overflows would have been a combination of stormwater and industrial wastes and would have flowed southward through Dead Creek to the Mississippi River. The 18-inch sewer line from Mississippi Avenue to Dead Creek, installed in 1932 as part of the Village Sewer System, would have served this purpose for the industries along Mississippi Avenue.

About 1939, after the 36-inch line under the Alton and Southern was connected to the Village Sewer System at Manhole 24, the 36-inch sewer under the Alton and Southern Railroad would have served the same purpose as the 18-inch sewer line to discharge a combination of industrial wastes and stormwater runoff to Dead Creek.

By 1943 when Dead Creek was blocked from flowing southward to the Mississippi River, Dead Creek was acting as a surge pond. How often the combined stormwater and industrial wastewater overflowed up until the late 1940's is not known because the information on the dry weather flows and the amount of rainfall runoff reaching the sewers is not known. Because of the limited capacity of the Village Sewer System and the desire to utilize the 36-inch sewer under the Alton and Southern Railroad as an overflow for the Village Sewer System, it is likely that an overflow occurred even during minor rainfall runoff events.

In 1951 additional sewers along Mississippi Avenue south of the Alton and Southern Railroad and to a point south of Queeny Avenue were constructed. At this time, the 18-inch overflow line from Mississippi Avenue was connected to the Village Sewer System so that normally

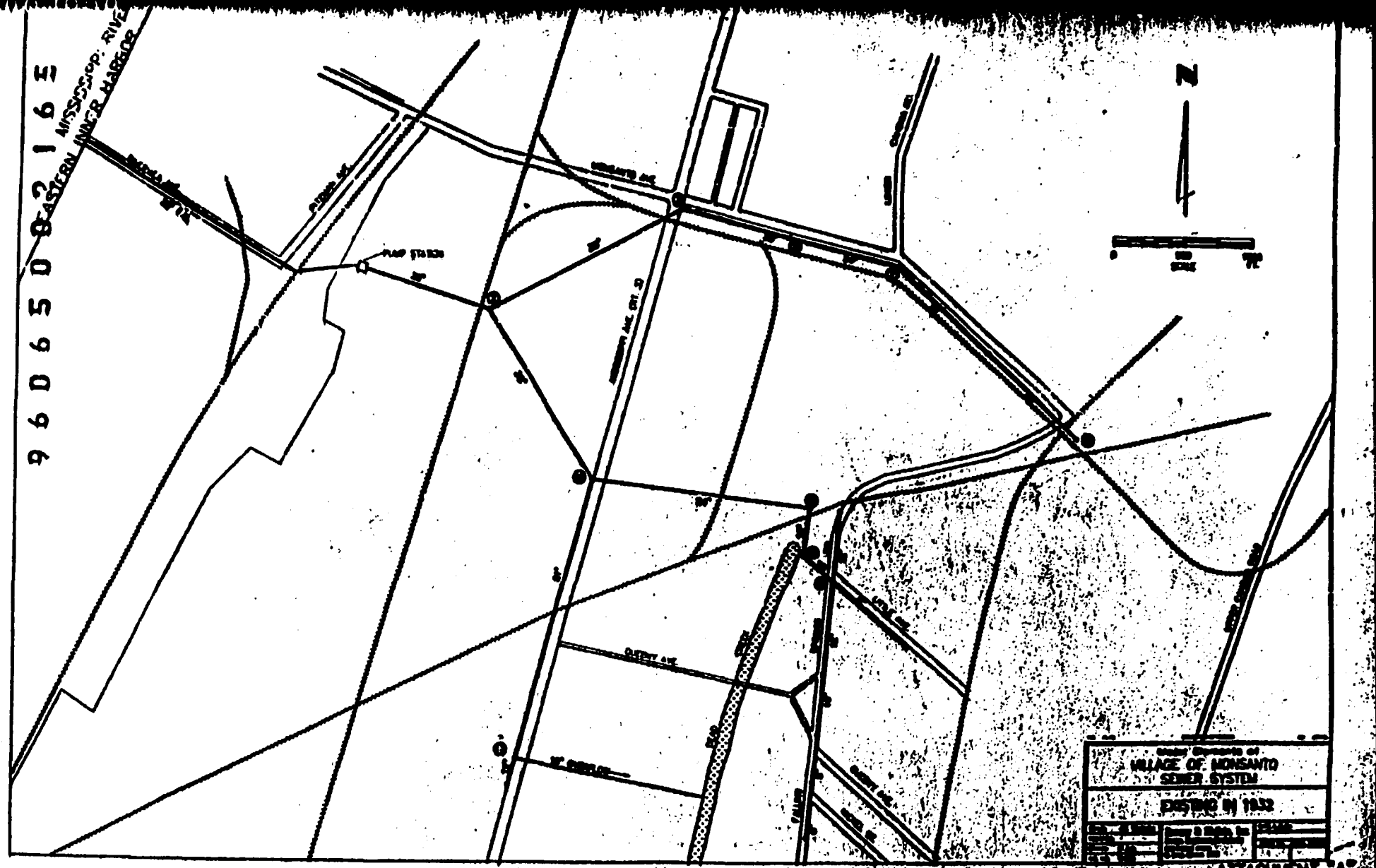
only stormwater would be discharged to Dead Creek and the industrial wastewater was discharged northward and stayed in the Village Sewer System.

Detailed data available for 1952 and the years immediately before this indicate that rainfall events of less than 1 year frequency would cause overflows to the Dead Creek Surge Pond through the 36-inch pipe under the Alton and Southern Railroad.

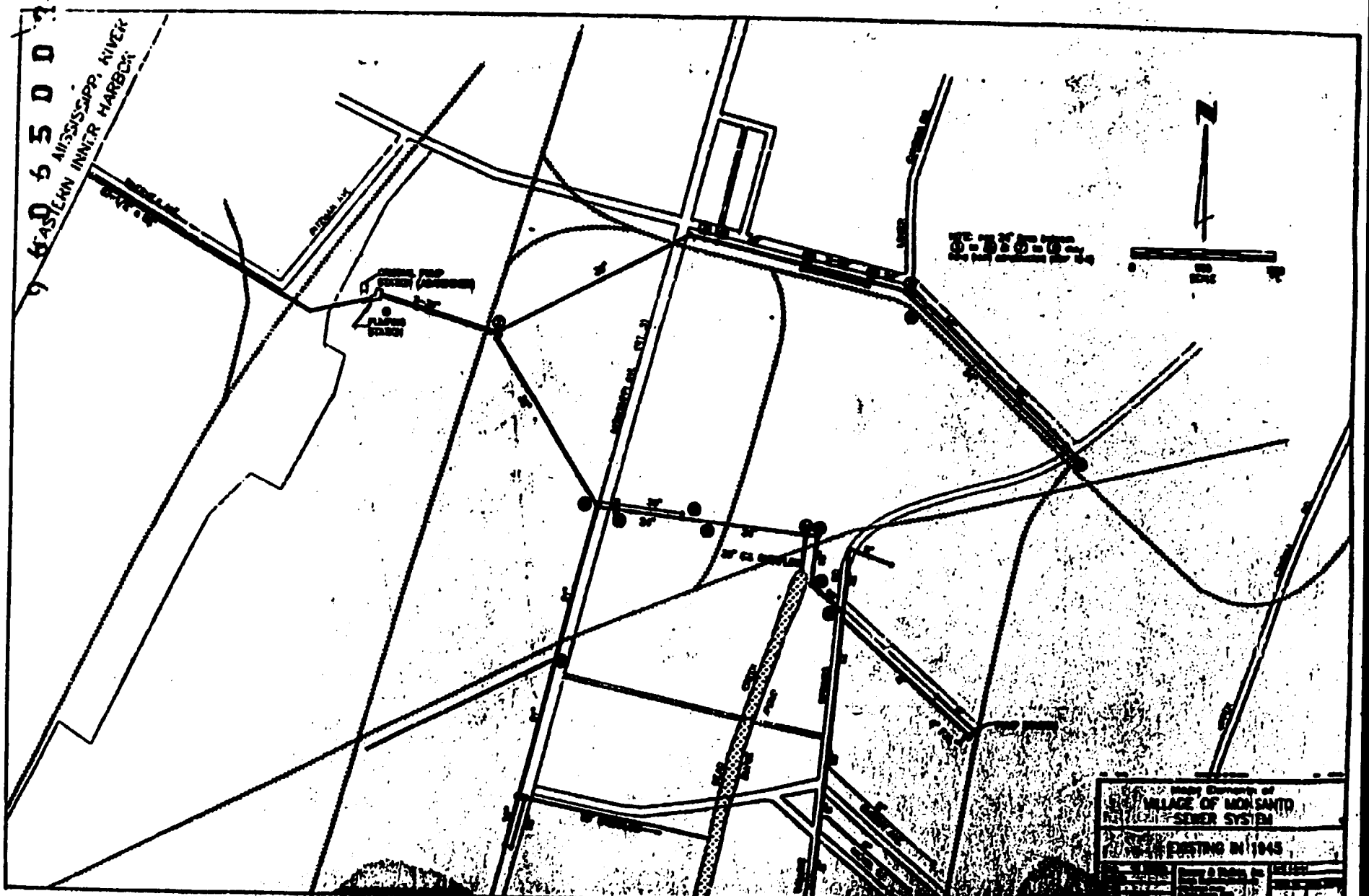
The substantial data available on the Village Sewer System from 1953 to 1965 makes it clear that rainfall events of a minor nature occurring many times a year, caused overflows into the Dead Creek Surge Pond. The Dead Creek Surge Pond was overtly considered a part of the Village Sewer System and essential to preventing flooding of plant sites during rainfall events. The continuation of this design concept was advocated and endorsed by Monsanto Company because it eliminated the need to construct extensive improvements to the Village Sewer System.

After 1966 when the dry weather flows into the Village Sewer System started to decrease the Village Sewer System had more capacity to receive stormwater flow. For this reason stormwater overflows would have decreased in frequency but even moderate rainfall events would have continued to cause overflows to the Dead Creek Surge Pond.

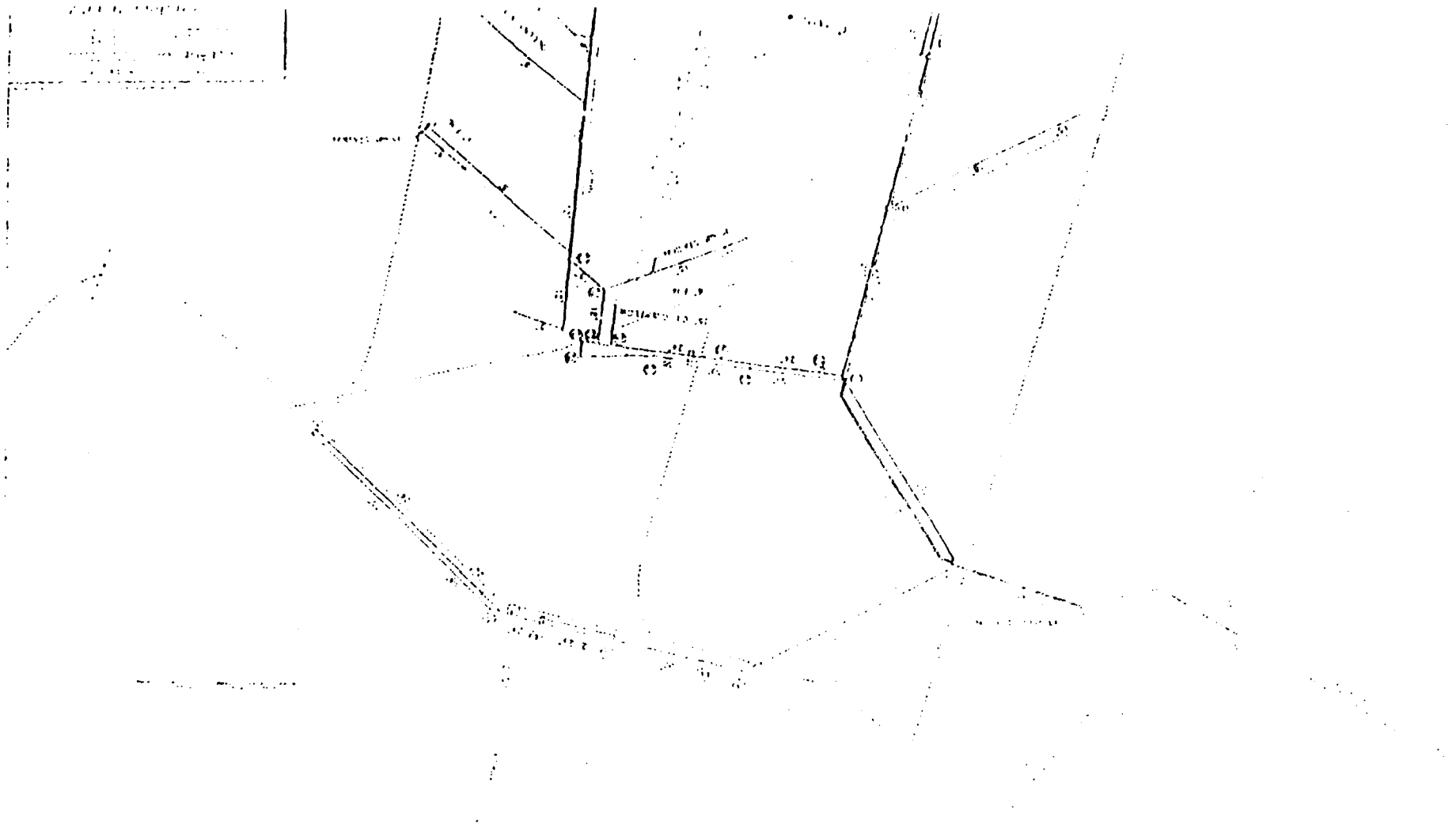
After 1984, increased sewer capacity further reduced the frequency of overflows to the Dead Creek Surge Pond but would not have ended them. An overflow in 1990 as the result of rainfall during the construction of the elimination of the Dead Creek Surge Pond demonstrated this.

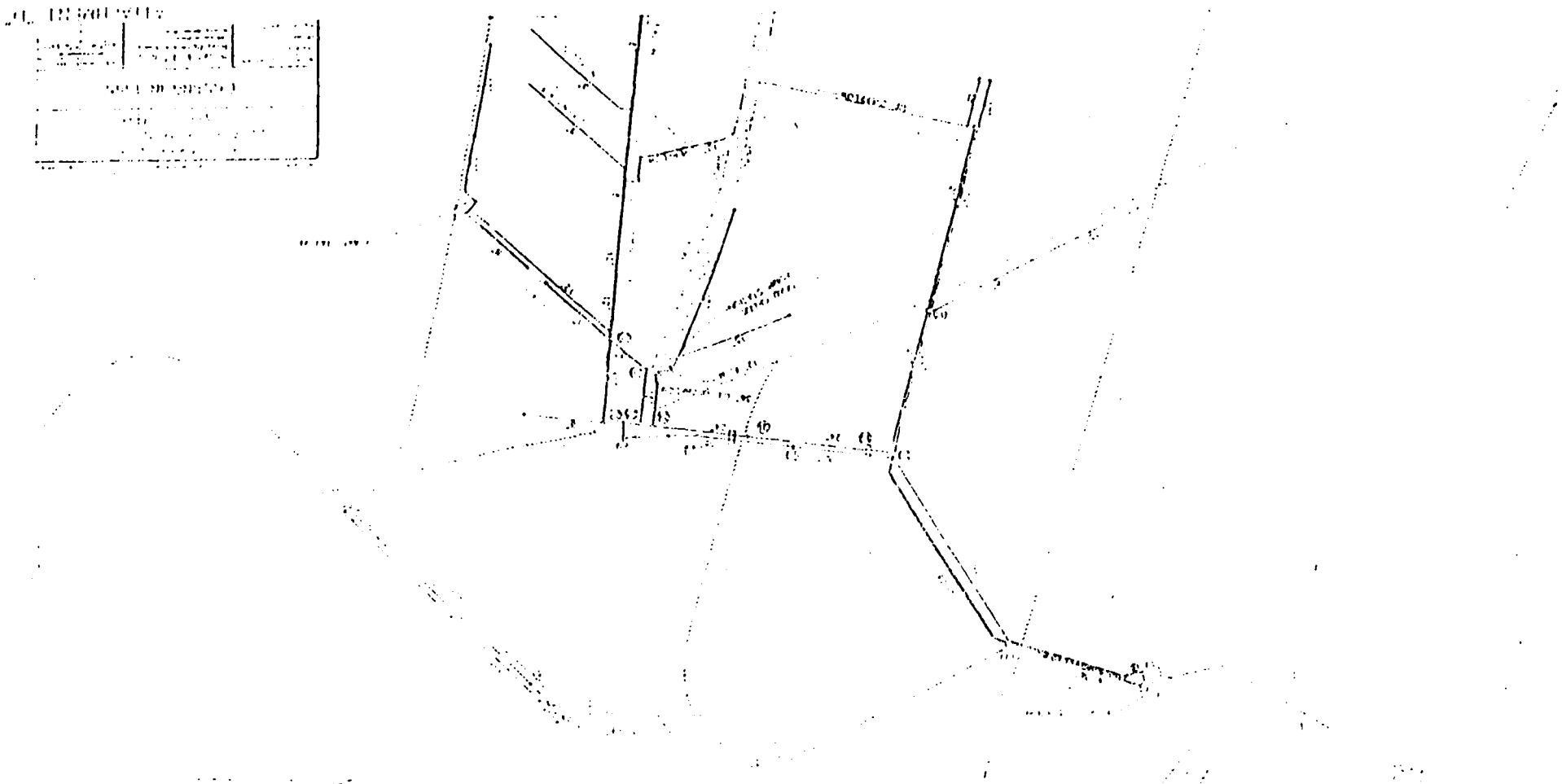


ATTACHMENT "A"


MISSISSIPPI RIVER
EASTERN INNER HARBOR
PUMPING STATION
N
VILLAGE OF MONSANTO
SEWER SYSTEM
EXISTING IN 1945

ATTACHMENT





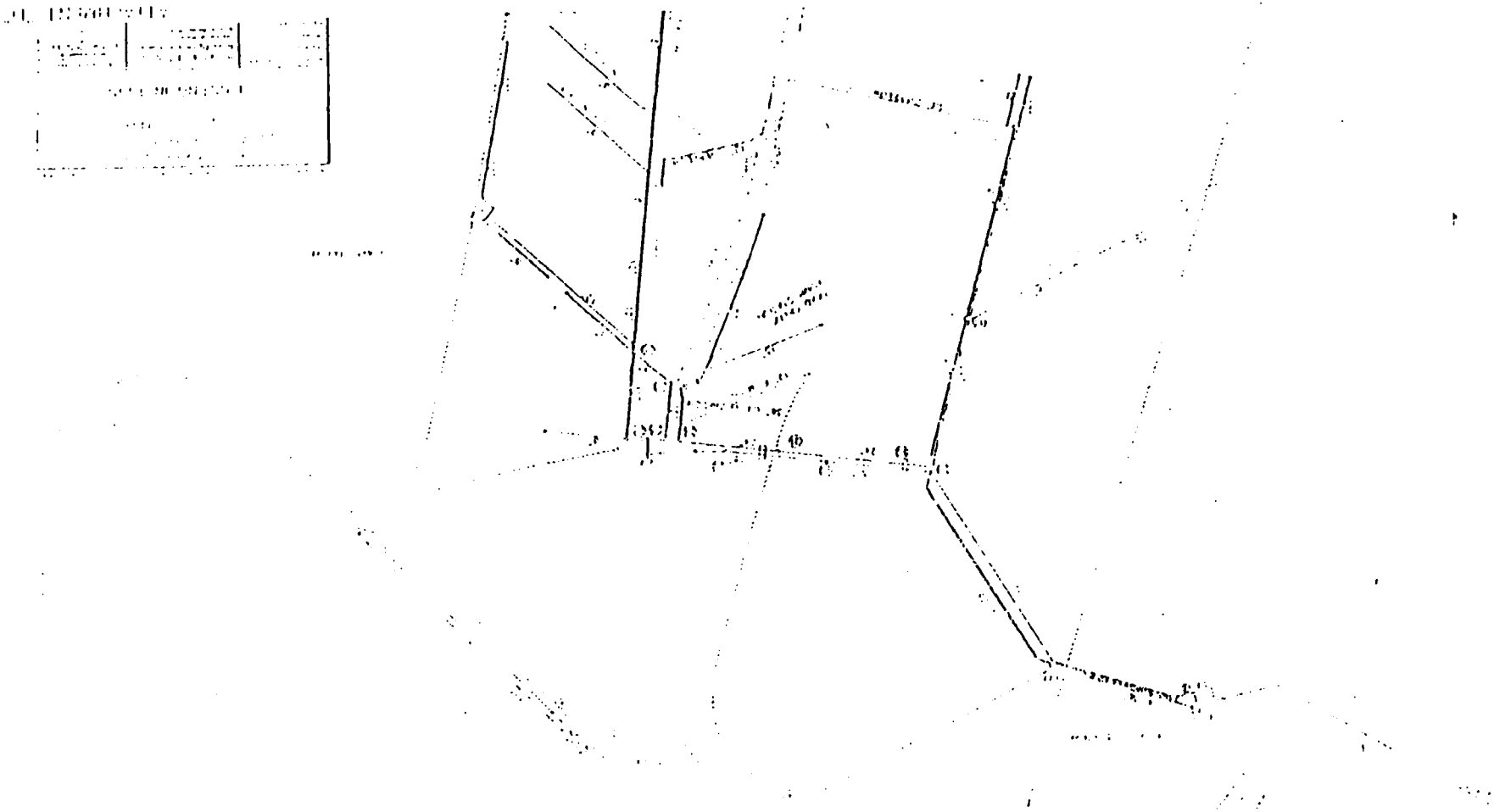


Exhibit 81

HOME OFFICE: BELLEVILLE, ILL.

PHONE: EXPRESS 554

B. C. McCURDY
Consulting Municipal Engineer

RECEIVED

[illegible] 1944

[illegible] DEPT. OF PUBLIC HEALTH

State Board of Health

Springfield, Illinois

Gentlemen:

Attached hereto are plans covering a proposed change in the Sewer System of the Village of Monsanto together with a photostat of a letter written by the Socony Vacuum Oil Co. that explains the need and nature of the proposed improvement.

In general we will reserve the present 18" & 15" lateral for future use of the Federal and Monsanto Chemical Companies lying north of Monsanto Avenue, since it is likely that they will require a corrosive resistant sewer connection. In view of probable increased future flow from this area, arrangements are made to extend this line westerly and parallel to existing 24" sewer along Monsanto Avenue from Falling Springs Road. The necessary application has been filed with [illegible] and the Village will proceed with the advertising for proposals [illegible] action in granting a permit to the Village of Monsanto for this work would be appreciated by all concerned.

Yours truly,

B. C. McCurdy
Consulting Engineer

BCMcC/r

May 31, 1944

MONSANTO-Sewerage
Sewer extension

Mr. B. C. McCurdy
Consulting Engineer
Belleville, Illinois

Dear Mr. McCurdy:

This acknowledges receipt of your letter of May 27, 1944, together with a photostat of a letter by the Socony Vacuum Oil Company and of plans for the proposed sewer extension to serve the Socony Vacuum Refinery. We have reviewed the plans and offer the following comments:

1. If specifications for the construction have been prepared we should appreciate receiving a copy of them.

2. The plan view of the existing 24-inch sewer extending west along Monsanto Avenue from Falling Springs Road indicates a slope of 0.[illegible]%, which with an n value of 0.015 indicates a capacity of 5000 g.p.m. The sectional view of this sewer indicates a slope of 0.17[illegible]% with a resulting capacity of about 2500 g.p.m. We note that the Socony Vacuum Refinery will have flows of 3000 g.p.m. for extended periods during each month, and wonder whether the remaining 600 gpm. capacity of the existing 24-inch sewer (assuming the 0.17[illegible] grade is correct) will be sufficient to handle the present flow from any other outlets into that sewer.

3. We assume from your letter that it is intended to extend the 15-inch lateral parallel to the 24-inch sewer on Monsanto Avenue west from Falling Springs Road. It was not entirely clear whether the 15-inch or the proposed 24-inch sewer will be extended, so will you please clarify this for us?

Upon receipt of a reply clarifying the above questions we shall issue a permit for the construction.

Very truly yours,

[illegible]

dcd-c

HOME OFFICE: BELLEVILLE, ILL. PHONE: EXPRESS 566

B. C. McCURDY
Consulting Civil Engineer

RECEIVED
JUN 5 1944
DIVISION OF SANITARY ENG.
ILLINOIS DEPT. OF PUBLIC HEALTH

June 2, 1944

Sanitary Water Board

Springfield, Illinois

Attention: William J. Dowler
Executive Secretary

Dear Sir:

In responde to your letter of May 31, 1944, concerning proposed extension to Monsanto Sewer System.

1. Completion of specifications awaits W.P.B. approval. When completed, I will mail you three sets.

2. The drop in 800' between the existing manhole at Monsanto Avenue and Falling Springs Road to the Manhole 800' westerly, along Monsanto Avenue is 1.4', resulting in a slope of .00175 for the existing 24" sewer, giving it a capacity of 8.25 c.f.s. (3680 G.P.M.) At the present time there is a negligible amount of sewage using the 18"-15" lateral coming from Federal Chemical. Westerly of Falling Springs Road, the U. S. Army has made a connection to the 24" sewer, but has constructed a second 24" sewer parallel, and south of the existing 24" sewer to the manhole where the 24" trunk sewer is enlarged to 30". The peak loads in industry rarely occur at the same time. I think we will find that the proposed arrangement will give satisfactory operating conditions. If it is found necessary to carry the improvement a step further, we will extend the 24" westerly to join the 24" that the Army laid. There are so many conditions that may arise without warning in this industrial district, that we have found that there is no practical way to anticipate plant expansions.

3. See foregoing. The new 24" will be extended.

After the war is over, we may find that the "existing" lateral is satisfactory. In such a case, we might use the proposed 24" sewer for a storm drain, using Dead Creek for an outlet.

Yours truly,

B. C. McCurdy
Consulting Engineer

BCMcC/rr

Exhibit 82

Subject Monsanto — Sewer Extension

Date B.C. McCurdy, Const. Engr.

Reviewed by D.E.R. Date 8/27/45

Plans consist of 884' of 30" vitrified clay pipe, encased in reinforced concrete, extending from Mississippi Ave. Eastward parallel to an existing 24" sewer. Purpose of this sewer is to prevent overflow of industrial wastes to Coal Creek by accomodating such wastes as now discharge into that channel within the Village.

Sewer size based upon most recent advice of Monsanto Chem. Co. re their future needs. Exact basis not given. (See McCurdy's Aug. 20, 1945, letter.)

Assume 36" sewer now existing between Miss. Ave. & Corondelet Ave. will carry flow. Special Manholes at both ends of this line built to allow tie a future parallel sewer if found necessary. This should be OK.

William J. Dewner

August 22, 1945

MONSANTO-Sewerage
Sewer extension
Permit #1945-16

Village President and Board of Trustees
Monsanto, Illinois

Permit is hereby granted to the Village of Monsanto, St. Clair County, Illinois, to construct and maintain a sewer extension having outlet to the existing sewer system at Mississippi Avenue, all in accordance with plans and specifications submitted by D. G. F[illegible]rty, Consulting Engineer, acting as your agent, said plans comprising [illegible] sheets, designated as "Extensions and Improvements Public Sewer Sy[illegible]m, Village of Monsanto", and being made a part hereof.

This permit is issued subject to the following conditions:

1. This authority is granted in accordance with the provisions of an act entitled "An Act to establish a Sanitary Water Board and to control, prevent and abate pollution of the streams, lakes, ponds, and other surface and underground streams in this State"; approved June 25, 1929; in force July 1, 1929, and subject to the provisions thereof.

2. This authority shall not be considered as in any manner affecting the title to the premises upon which the sewerage works in question are to be located.

3. This authority does not in any way release the permittee from any liability for damage to person or property caused by or resulting from the installation, maintenance or operation of the sewerage system, located and constructed in accordance with the plans and specifications herein referred to.

4. The Sanitary Water Board in issuing this permit has relied upon the statements and representations made by the permittee in the application hereof and in case any statement or representation in said application is found to be incorrect this permit may be revoked without further notice and the permittee thereupon waives all rights thereunder.

5. There shall be no deviations from the plans and specifications submitted with the application for this permit unless revised plans and specifications therefor shall first have been submitted to the Sanitary Water Board and a supplemental written permit issued therefor.

6. The Sanitary Water Board or any person duly authorized by it may, at any time during the progress of the construction or the installation of the sewerage system or any part thereof under authority hereof, have the right and authority to inspect such work during the progress thereof; and, such Board or its duly authorized agent shall have the authority at any and all times after the erection or the installation of such sewerage system to inspect the same or the operation thereof.

7. This permit is void after August 22, 1948, unless construction on this project has started on or prior to this date.

STATE SANITARY WATER BOARD

By_____
Technical Secretary

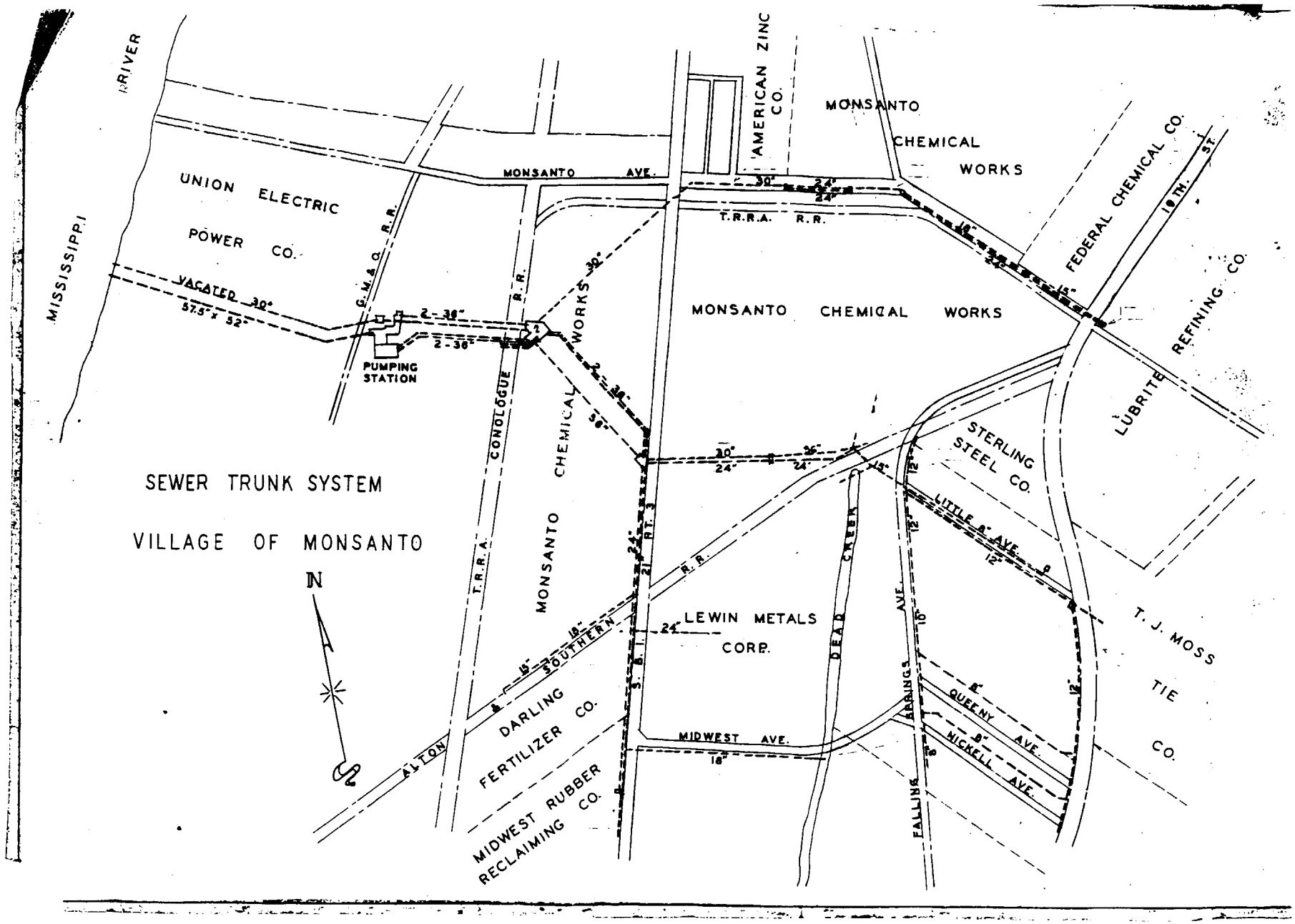
ded-c
cc. B. C. McCurdy, Engr.
Dist. Health Unit #16
St. Clair Co. Health Dept.

And_____ M.D.
Chairman

P.S. Mr. McCurdy: We are returning, stamped "Approved", two copies each of plans and specifications. Only one copy of each is required for our files, and unless you desire to have copies stamped "Approved" and returned to you, it is only necessary for you to submit one copy of plans and specifications to this office.

W.J.D.

Exhibit 83



MISSISSIPPI RIVER
UNION ELECTRIC POWER CO.
VACATED 30"
57.5" x 52"
G.M.&O. R.R.
PUMPING STATION
2-36"
2-36"
MONSANTO AVE.
CONOLOGUE R.R.
T.R.R.A.
MONSANTO CHEMICAL WORKS
AMERICAN ZINC CO.
MONSANTO CHEMICAL WORKS
T.R.R.A. R.R.
FEDERAL CHEMICAL CO.
19TH. ST.
LUBRITE REFINING CO.
STERLING STEEL CO.
LITTLE 8" AVE.
T. J. MOSS TIE CO.
SEWER TRUNK SYSTEM
VILLAGE OF MONSANTO
N
ALTON & SOUTHERN R.R.
DARLING FERTILIZER CO.
MIDWEST RUBBER RECLAIMING CO.
S.B.I. RT. 3
LEWIN METALS CORP.
DEAD CREEK
FALLING SPRINGS AVE.
MIDWEST AVE.
QUEENY AVE.
NICKELL AVE.

Subject Montsanto Sewerage
Date Plans & Specs, B. C. McCurdy
Reviewed by Carl D. Gross Date Sept. 14, 1948

Plans & spes. in triplicate — Plans 6 sheets rec'd Aug. 20 for following 3 projects
Little Ave Sewer Extension
Lewin-Mathes Sewage Pumping Station
Falling Springs Road Sewage Pumping Station Alterations

LITTLE AVE SEWER EXTENSION (1 sheet)

To ultimately accomodate 20-24 single family dwellings or about 10,000 gals per day
Total length abt 500 [illegible] manholes on 8" gravity sewer @ 0.55% located @ 0+10, 2+60 & 4+75
Sewer depth abt 8-9
8" V.P.

Elevations:		
	Invert sewer into pump sump	402.[illegible]
	F.L. 4" force main @ "	409.[illegible]
	" @ disch to M.H.	412.[illegible]

Gravity sewer discharges into pump sump and sewage is to be pumped back thro 500.00 4" force main to manhole on existing sewer beside origin of proposed 8" gravity collection sewer.

LEWIN-MATHES SEWAGE PUMPING STATION (1 sheet)

Stated that L-M Co estimates sewage volume as 350 g.p.m.
Proposal includes: 360' of 6" force main; pump sump; 4" pump; and necessary accessories.

Elevations —		
	invert of sewer entering pump sump	406.34
	F.L. invert of disch @ pump sta	409.00
	F.L. force main @ entrance to M.H. proposed Monsanto Chem Co. Rd. [illegible]	412.00

Note: Force main protected by steel thimble under tracks of Alton & Southern R.R.

FALLING SPRINGS ROAD PUMPING STATION ALTERATIONS

The existing pump & motor is to be set in the existing sump after reconstruction of the pump sump and necessary changes in piping, controls, wiring etc — all without interrupting sewer service.

The pump, sump and controls are to be identical with Little Ave, Lewin-Mathes [illegible] stations to permit maintaining a stock of [illegible] interchangeable and to give the briefest possible interruption of sewer service.

PUMPS

To be vertical 4" centrifugal [illegible] type, counter clock wise

Subject Montsanto Sewerage

Date Plans & specs — B. C. McCurdy

Reviewed by Carl D. Gross Date Sept. 13, 1968

rotation, 4" discharge, bronze impeller to pass 1 1/4" sphere, Minimum capacity 200 g.p.m — Maximum 600 gpm (Fairbanks Morse & Co. (Branch Order 708, Fig. 6715, 4 30, 47 Montsanto or equal) 7 1/2 H.P. 400 Volt 3 phase 60 cycle 1800 RPM vertical motor

No check or gate valves needed — Pump disch is 4" dia loop closure (with simplex 1" air relief valve at top)

Note (1) No max. allowable sewer infiltration specified

Note (2) Pump specs do not include T.D.H or shutoff head.

Pump liquid level control, floatless with electrodes of B/W Controller Corporation

PROPOSED MONTSANTO STD. Type SUMP (wet well type)

Dia outside on top 8'-10" = 6'-0"
" " on bottom 10'-0" ± = 7'-0"
" inside, entire depth = 5'-0"

Issue permit with a separate letter to McCurdy on Notes 1 & 2 & requesting reply & revisions on both. This exception to general policy made because of B.C.H.'s experience & reliability.

PUMPING HYDRAULICS

? Little Ave Abt. 500' of 4" Force Main

* Friction @ 200 gpm = 22' @ 600 = 168'
See (2) on letter Static head 11' 11'
TDH 33' 179'

Lewin - Mathes Abt. 350' of 6" Force Main

Friction @ 200 gpm = 2.03' @ 600 = 16.3'
Static head 9' 9'
TDH 11.+ 25'+

Subject Monsanto sewerage - Relief sewer (Monsanto Chemical Co.) (51957—10M—2-48)

Data B. C. McCurdy - plans & specs for our information — Relief Sewer

Reviewed by Carl D. Gross, 1 Sheet "Sewer System, Monsanto" Date Sept. 27, 1948

7 sheets of plans "Village of Monsanto Illinois, Monsanto Chemical Co."

The proposal, an extension of a 30" dia relief sewer constructed 1945 includes:

- 641' of 36" v.c.p. encased in reinforced concrete } Total length
- 4 reinforced concrete manholes lined with brick
- 160' of 108" multi plate pipe tunnels in open cut.

The proposed 36" relief sewer is to parallel an existing 24" sewer and another 36" relief sewer may be required (shown by blue crayon on appended map of Monsanto Sewer System) in 1949-1950.

Propose 36" sewer to start @ end of 30" encased sewer built 1948, Sta 9+00 (Manhole) Elev. 403.00 and to end @ Sta. 15+51. Also manholes @ 11+80, 14+15 & 15+39 (end) Elev 404.

Grade $\frac{1.00}{641}$ = 0.156 % Drop of 0.10' thru each of 2 MHs

hence grade = $\frac{0.80}{641}$ = 0.125 %

From curves, N = .013, Q = 24 c.f.s. = 10,800 gpm & V = 3.5'/sec

Open cut, also tunnels under R.R. are to have 108" dia. 10 gage Multiplate metal pipe inside of which the 36" v.c.p. will be supported by precast concrete cradles, resting upon a 6" thick concrete bedding course over an 18" thick sand cushion placed in the invert of 108" pipe

Reinforced concrete manholes are 7'-8" □ outside dimensions; 6'-0" inside with 4" brick linings. Tops are flush with surface. Manhole openings are 48" x 36" covered by "Neenah" No. R 4995 Type "L" Heavy Duty covers

Recommend permit be issued.

Acidity will not seriously lower the pH of the Mississippi River whose min. flow exceeds 20,500 c.f.s.

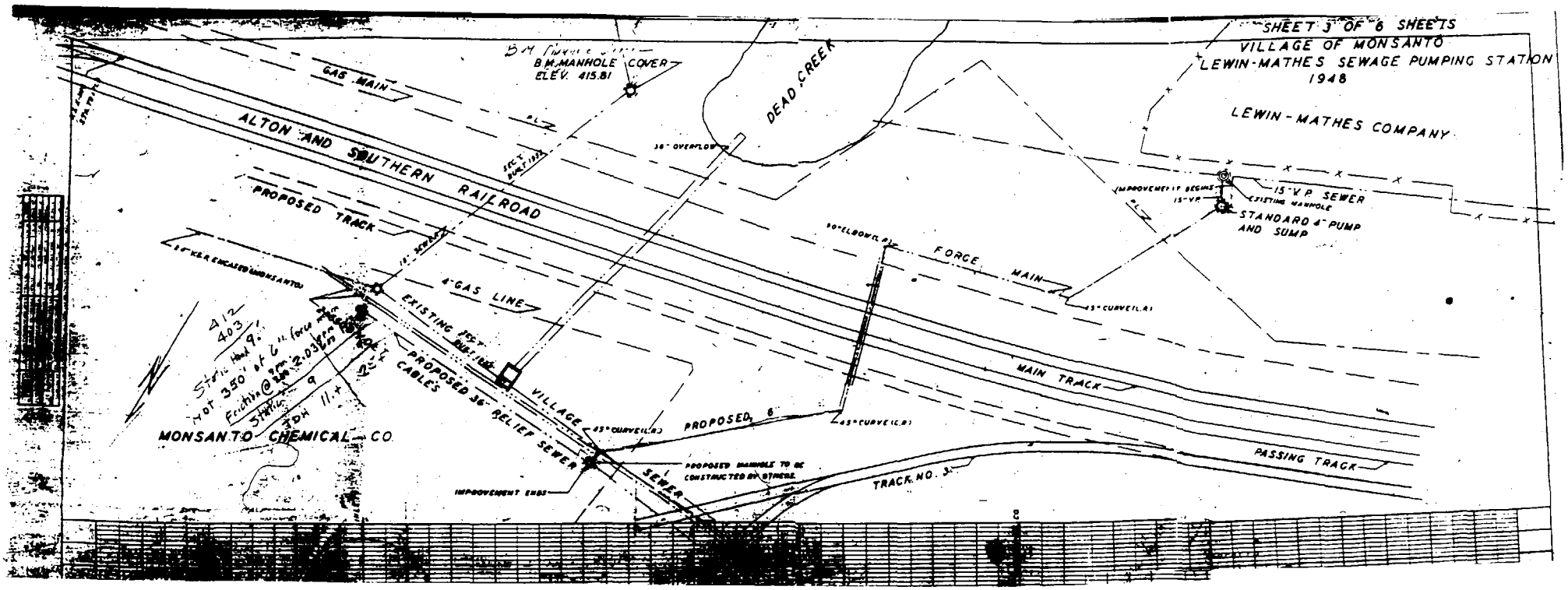

SHEET 3 OF 6 SHEETS
VILLAGE OF MONSANTO
LEWIN-MATHES SEWAGE PUMPING STATION
1948
LEWIN-MATHES COMPANY
B.M. MANHOLE COVER
ELEV. 415.81
DEAD CREEK
GAS MAIN
ALTON AND SOUTHERN RAILROAD
PROPOSED TRACK
36" OVERFLOW
15" V.P. SEWER
EXISTING MANHOLE
STANDARD 4" PUMP AND SUMP
FORCE MAIN
4" GAS LINE
EXISTING
PROPOSED 36" RELIEF SEWER
VILLAGE SEWER
PROPOSED 6"
MAIN TRACK
PASSING TRACK
TRACK NO. 3
MONSANTO CHEMICAL CO.
IMPROVEMENT ENDS
PROPOSED MANHOLE TO BE CONSTRUCTED BY OTHERS
412
403

Exhibit 84

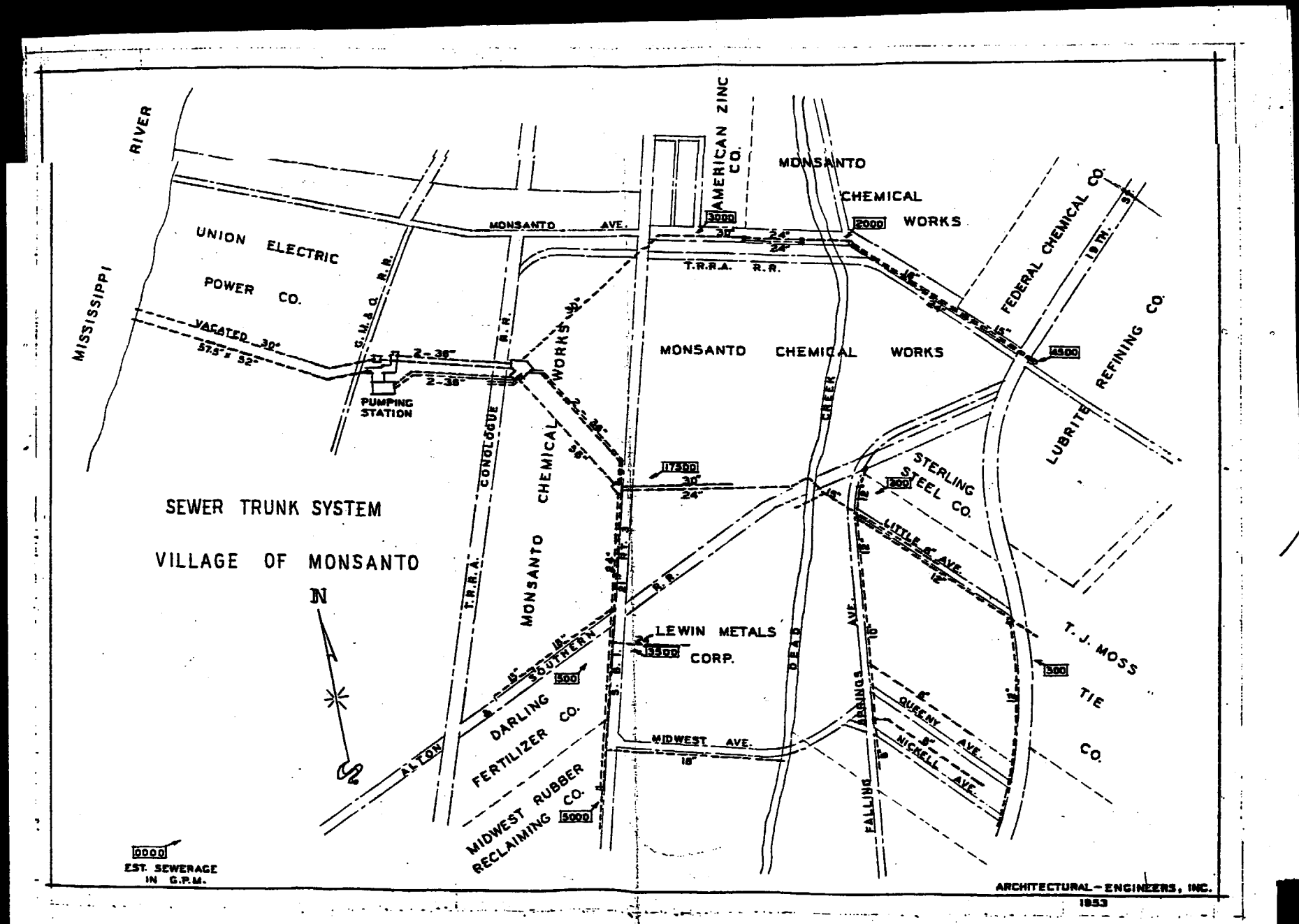

SEWER TRUNK SYSTEM
VILLAGE OF MONSANTO
N
MISSISSIPPI RIVER
UNION ELECTRIC POWER CO.
VACATED 30"
57.5" x 52"
G.M.&O. R.R.
PUMPING STATION
2-36"
2-36"
MONSANTO AVE.
AMERICAN ZINC CO.
3000
MONSANTO CHEMICAL WORKS
2000
T.R.R.A. R.R.
FEDERAL CHEMICAL CO.
19TH. ST.
LUBRITE REFINING CO.
4500
MONSANTO CHEMICAL WORKS
CONOLOGUE R.R.
T.R.R.A.
MONSANTO CHEMICAL WORKS
17500
30"
24"
DEAD CREEK
STERLING STEEL CO.
300
LITTLE 8" AVE.
LEWIN METALS CORP.
3500
S.B.I. RT. 3
SOUTHERN R.R.
ALTON
DARLING FERTILIZER CO.
500
MIDWEST AVE.
18"
MIDWEST RUBBER RECLAIMING CO.
5000
FALLING SPRINGS AVE.
QUEENY AVE.
NICKELL AVE.
T. J. MOSS TIE CO.
500
0000
EST. SEWERAGE IN G.P.M.
ARCHITECTURAL-ENGINEERS, INC.
1953

Exhibit 85

METCALF & EDDY
ENGINEERS
STATLER BUILDING
BOSTON 16 MASSACHUSETTS

June 29, 1960

RECEIVED
JUN 1 1 1960
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

J - Monsanto STR

Mr. C. W. Klassen
Chief Sanitary Engineer
Sanitary Water Board
Springfield, Illinois

Re: Waste Treatment - Monsanto Village, Illinois

Dear Mr. Klassen:

Our program of gaging and sampling of the wastes from the various contributors in Monsanto Village is nearing completion. Our surveys on the Lewin-Mathes, American Zinc and Midwest Rubber Co. wastes have led us to question the advisability of attempting to treat the total flow of Monsanto Village wastes by biological means, because of the relatively high concentrations of copper and zinc ions in the waste. The total flow of metal bearing wastes approximates 12 mgd.

We are initiating some biological treatability studies this week on the combined village wastes and on the same without the metal bearing wastes. If these studies show there is any advantage to segregating the metal bearing wastes for separate treatment, we shall, of course, have to recommend such a course of action.

The main purpose of this letter is to inquire as to whether the Sanitary Water Board will require more than primary treatment designed to remove floating and settleable solids from the 12 mgl. of metal bearing wastes. We anticipate the pH of the wastes will be between 4 and 5 and they will contain from 10-20 mg/L of copper ion and from 25-50 mg/L of zinc ion. Chromium is expected to be under 1 mg/L.

Mr. C. W. Klassen
June 20, 1960

In view of the great dilution available in the Mississippi River, we cannot conceive of such amounts of metallic ions being a problem. We would appreciate an official opinion, however, as a guide in making our recommendations.

Sincerely yours,

METCALF & EDDY

By: Clair N. Sawyer

Clair N. Sawyer

CNS:am

cc: J. W. Goldenberg

S.W.B.

June 23, 1960

BI-STATE - Monsanto Village
Waste Treatment

Mr. Clair N. Sawyer
Metcalf and Eddy
Statler Building
Boston 16, Massachusetts

Dear Mr. Sawyer:

In your letter of June 20, 1960 the question of treatment of metal bearing wastes at Monsanto Village was presented. Specifically, was removal of floating and settleable solids from the metal bearing wastes sufficient? The dilution of the Mississippi River was to be used to disperse the low pH, and metal ions involved.

The problem which we have approached through the Bi-State Compact and the Federal Pollution Control Law is the reduction of reliance on the Mississippi River dilution for waste treatment. All along the line reduction is the order and the degree will tend to increase in the future.

The Bi-State criteria specifies that highly toxic substances be eliminated or reduced to safe limits. We would, therefore, like to know what salts of copper and zinc are present in these wastes. Permissible concentrations of these heavy metal ions in streams are quite low. Generally, none should be present in more than 1 ppm and all heavy metals should not greatly exceed this limit. Toxic substances including metallic ions, phenolic compounds, oils, alkalies, and acid should be virtually eliminated from sewage effluents. The pH of the river following initial dilution should not be less than 6.7 or more than 8.5. This quality will probably be attained if plant effluents are adjusted to a pH value within the range of 5.5 to 10.6.

In accordance with our present standards the effluent from a metal waste treatment unit should not exceed the following concentrations:

Chromium Hexavalent	3 ppm	Cadmium	3 ppm
Chromium Trivalent	10 ppm	Nickel	3 ppm
Copper	1 ppm	Cyanide	0
Zinc	1 ppm	pH	6.5 to 8.5

Very truly yours,

Technical Secretary

DBM:pm

cc - West Central Regional Office
- Jack K. Smith, Water Pollution Board
- J. W. Goldenberg, Cons. Engr.

Blind cc - [illegible], Warner and Shifrin

METCALF & EDDY
ENGINEERS
STATLER BUILDING
BOSTON 16 MASSACHUSETTS

RECEIVED
July 18, 1960

J - Monsanto STR

Mr. C. W. Klassen
Technical Secretary
State Sanitary Water Board
Springfield, Illinois

Dear Mr. Klassen:

We are in receipt of your letter of June 23 in reply to our inquiry of June 20, 1960. Your letter arrived just before I left on my vacation, so I hope you will pardon the delay in answering.

The copper and zinc salts contained in the wastes at Monsanto are principally in the form of sulfates but some may occur as hydroxide precipitates when the pH of the wastes is at levels of 5 and above.

You state in the third paragraph of your letter: "Permissible concentrations of these heavy metals ions in streams are quite low. Generally, none should be present in more than 1 ppm. and all heavy metals should not greatly exceed this limit." We interpret this to mean that the total heavy metal ion concentration (Cu, Zn, Cr) in the Mississippi River should not exceed 1 ppm. On this basis, we do not understand your reasoning in establishing limits of one ppm. on copper and on zinc from a treatment plant as indicated in the fourth paragraph of your letter.

We have been basing our calculations on the assumption that the minimum flow of concern in the Mississippi River is 45,000 cfs., or approximately 29,000 mgd. The flow of metal bearing wastes at Monsanto averages about 12.5 mgd. Thus, the river provides a safe dilution factor of 2300 to 1.

Our data are now complete on the copper, chromium and zinc content of the wastes from the three major industries whose wastes would be segregated for separate treatment, namely

Mr. C. W. Klassen
July 18, 1960

Lewin-Mathes, American Zinc and Midwest Rubber. We estimate that the combined 12.5 mgd. flow will have the following content of heavy metal ions:

copper	5.0 mg/L
zinc	30.0 mg/L
chromium (total)	0.5 mg/L

On the basis of a 2300 to 1 dilution afforded by a flow of 45,000 cfs. in the Mississippi River, the calculated increase in copper, zinc and chromium levels in the river would be as follows:

copper	0.0022 mg/L
zinc	0.013 mg/L
chromium	0.0002 mg/L
Total	0.0154 mg/L

These levels are definitely in the order of trace amounts and the total is only 1/65 of the limits established in the third paragraph of your letter. On this basis, we fail to see the need for removal of the metal ions.

We hope you will reconsider the matter of heavy metals in light of the information presented above. As a final phase of our field investigations at Monsanto, we are planning to sample the sewers carrying metal wastes for the purposes of preparing composited samples, in order that we may have verification of our calculated values.

We trust we may hear from you relative to this matter in the near future.

Kind regards.

Sincerely,

METCALF & EDDY

By: Clair N. Sawyer

Clair N. Sawyer

CNS:am

cc: J. W. Goldenberg

METCALF & EDDY

ENGINEERS

STATLER BUILDING
BOSTON 16, MASSACHUSETTS

RECEIVED
AUG 12 1960
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

Village

J-Monsanto STR

August 10, 1960

State Sanitary Water Board
Springfield
Illinois

ATTENTION: C. W. Klassen, Technical Secretary

Gentlemen:

We are in receipt of your letter of July 27, 1960, in reply to our letter of July 18, 1960 inquiring as to the mode of handling the metal bearing wastes from American Zinc, Lewin-Mathes and Midwest Rubber plants at Monsanto Village. We are pleased to note that you will consider primary treatment, with provisions for removal of floating and settleable solids, as adequate for discharge to the Mississippi River.

We have conferred with officials of both American Zinc and Lewin-Mathes concerning slug or batch discharges of concentrated wastes and have been assured that they will provide facilities for capture and control of such losses.

We made special studies on composited samples of the metal bearing wastes on August 4 and 5 to ascertain pH, residual copper and zinc in the settled unneutralized wastes, and the volume of sludge to be handled. Our data on the after one hour settling were as follows:

	August 4	August 5
pH	6.6	6.8
Cu++	2.9 mg/L	3.5 mg/L
Zn++	25.0 mg/L	30.0 mg/L

The volume of sludge produced was equal to 0.4% of the raw waste volume.

Because of the favorable pH of the combined wastes, we are of the opinion that most of the copper will be captured in the sludge and the zinc will be in the range of 25-30 mg/L because of its natural solubility. These values are in fairly good agreement with the values we had predicted in our letter of July 18, in fact the value for copper is somewhat better.

Our studies have progressed to the point where it appears that there is a definite economic advantage in segregating the metal bearing wastes at Monsanto Village and providing two treatment plants. Your prompt reply to our letter of July 18 and reconsideration of the matter of metal bearing wastes has facilitated our studies greatly.

As soon as our plans have been formalized, we would appreciate the opportunity to discuss them with you before preparing our report to the Village of Monsanto.

I am sure you will be interested to know that our activated sludge studies showed that the phenol bearing wastes (Mobil Oil plus Monsanto Chem.) were amenable to biological treatment and that separate treatment of them appears to offer definite advantages, in addition to economic considerations.

Very truly yours,

METCALF & EDDY

By: Clair N. Sawyer

Clair N. Sawyer

CNS/par

cc: Mr. Goldenberg

Exhibit 86

MEMORANDUM

SUBJECT: MONSANTO - Village and Industry Sewage Treatment

DATE: August 31, 1960

As requested by Mr. Goldenberg in a letter August 19, 1960, a conference was held in the Sanitary Water Board Offices August 31, 1960. The Board was represented by C. W. Klassen, R. S. Nelle and D. B. Horton. The Village of Monsanto was represented by the following: Leo Sauget, Mayor; Clair M. Sawyer, Metcalf and Eddy; Dean Coburn, Metcalf and Eddy; and Joseph A. Goldenberg and Yuseph Yakinian, Consulting Engineers for the Village.

The purpose of the conference was to discuss some of the engineering data and proposals for treatment works preliminary to completion of the engineering report to the Village. Mr. Sawyer gave a review of the survey and proposals along with the problems encountered. These are discussed below without attempting to edit or orient subject matter.

The study was concerned with volume and character of wastes from the major industries of the Village. This information is necessary in part to base revenue service charges and as an element in the design and treatment of the wastes. Two phenol producing wastes were studied - that from Monsanto and from Mobil Oil Company. A steel casting company and a fertilizer plant produce only domestic waste with perhaps a little fertilizer added which may be beneficial. Lewin-Mathes, American Zinc, and Midwest Rubber waste contains considerable zinc ion. In addition, the Lewin-Mathes waste contains considerable copper ion. One of the major questions to be resolved was whether to treat the wastes together or separately.

Monsanto has had a pilot plant operation for several years and had treated combined waste in a reasonable manner. However, the process was subject to periodic upsets, probably from the metal ions. Using Monsanto equipment, a study was made of the treatability of combined and separate wastes. Studies were made on two bases, five to six hour retention and ten to twelve hour retention. There was very little difference in phenol removal under either retention time. There appeared to be no basis for separation of wastes in this phase of the study. It was found that an irreducible level phenol reduction was reached over a varying range of volume and/or up to twenty hours duration of high strength. It

was found that separate treatment reduced phenol to an average of 1.3 ppm equivalent to 280 lbs. per day, and combined treatment reduced phenol to 1.4 ppm equal to 420 lbs. per day. (A State memorandum prepared January 30, 1959 for a discussion of Missouri indicated the discharge of phenol by Monsanto should not exceed 500 lbs. per day. This is based on known phenol loads and minimum stream dilution average.) Mr. Sawyer believed there was merit to separate treatment and this was based in part on economics of plant construction and available land.

The mineral acidity and a pH of 2 in the metal bearing waste would require two-stage treatment, one stage at a junction box upstream - the other at or near the pumping station. It is proposed to rehabilitate the existing Village-owned pumping station for the treatment works in anticipation that the Corp of Engineers will provide a new pumping station in connection with the levee elevation work now in progress. Waste would be pumped to a clarifier for removal of oil and scum and grit as these wastes are very dirty. A pH of 4 would be maintained at the clarifier. Oil and scum would bleed off to a holding tank for industrial disposal. Grit would be discharged to the sludge lagoons. The effluent would go to a phenol control tank to bring the phenol to 8. An emergency storage lagoon of six hour or 68 MG to take slug wastes would be connected ahead of the phenol control tank. In this way, slugs could be pumped back into the system during lower flow or lower strength periods. Neutralization yields copper and aluminum hydroxides which precipitate as a heavy flock. This has been found advantageous in the activated sludge process and improves phenol removal. The neutralized effluent will enter activated sludge tank designed for five to six hour retention. These tanks will be 80' x 200' and four in number. The capacity is such that one tank can be taken out of service for repair or maintenance. Influent will be by a channel between tanks down the long side and will probably be introduced in step aeration fashion since the tanks will be completely aerated. The return activated sludge will also be fed in by "patented" method at various stages along the inlet. This procedure will minimize effect of any shock loaded on the activated sludge. It is anticipated that turbine type aerators with or without diffused air will be used. Pilot plant experience showed low aeration solids necessary for good phenol removal. Therefore, there will be considerable waste activated sludge.

Effluent will go to rectangular final tanks designed for 2,000 gallon per sq. ft. settling return and peripheral feed. Final B.O.D. will be in the range of 30 to 40 although limited attention was paid to this in the studies since the function of treatment was to remove phenols.

The big problem is sludge. It is anticipated there will be 165,000 gallons per day to be placed in sludge lagoons. Available land is valued at $6,000 per acre and there is only 120 acres available.

Twenty-five acres is needed for the plant and future expansion and 120 acres of lagoon would be required for this volume.

With separate treatment it would cost about $400,000 to separate the metal wastes by means of interceptors and sewers and conversion of one-half of the lift station to this purpose. The metal wastes would receive clarification and sludge removal to the lagoon similar to that proposed in the combined treatment works above. This primary treatment would produce about 50,000 gallons per day of sludge. The phenol waste would be passed through a plant identical to the combined plant. It was found that the amount of lime necessary to neutralize the waste would be approximately the same whether a combined or separate treatment was provided. The sludge produced by the phenol waste treatment would be in the neighborhood of 50,000 gallons to which would be added about 7,500 gallons of waste activated sludge. Under this method, eighty acres of lagoon would be required for approximately 110,000 gallons per day of sludge. It is proposed that four lagoons of twenty acres each be provided. This would leave only about fifteen acres for sludge cake storage sufficient for from five to seven years. Thereafter, cake disposal would be a problem.

The key recommendation of Dr. Sawyer is to use the separate treatment plant with one sludge lagoon of about forty acres to hold about 58,000 gpd of sludge from the clarifiers. He proposes that the waste sludge from the final tank be discharged with the effluent direct to the river. It is anticipated that the final tank effluent will have a solid content of 30 ppm. The waste activated sludge will run from 80 to 100 ppm, therefore, the combined effluent would contain 120 to 130 ppm solids. It was argued that these activated sludge solids are less objectionable than the solids from primary treatment and would not be any greater in volume than those resulting from primary treatment of domestic waste such as will occur at East St. Louis. The resultant reduction in sludge lagoon area will leave fifty-five acres for expansion and sludge cake storage.

Mr. Klassen brought out that neutralization of the raw waste increased the solids which would not be entirely removed by the proposed treatment. Dr. Sawyer stated fifty tons of lime per day would result in about thirty tons of solids returned to the river. The reduction of these additional solids is a result of the mandatory need to reduce acidity and to aid in the removal of phenols. A final decision on this proposal was not asked or given. Dr. Sawyer will present the basic question in a letter to which they would appreciate an early reply. Metcalf and Eddy is up against a deadline for presenting their engineering report so a delay would be disadvantageous. Mr. Nelle discussed the possibility of introducing aerobic digestion for this waste sludge prior to discharge to the river. Reference may be made to this possibility in Dr. Sawyer's

letter. The cost of sludge disposal through the proposed sanitary district sludge plant was discussed. They have cost estimates on the various methods of sludge disposal:

1. Combined treatment - Capital cost $964,000 and annual cost of $85,000.

2. Separate treatment - Capital cost $840,000 and annual cost of $72,900.

3. Using sludge dewatering and storage - Capital cost $1,890,000 and annual cost of $177,000.

4. Sludge dewatering and incineration - Capital cost $2,920,000 and annual cost of $342,000.

4a. This proposal is to be added to their original cost breakdown and involves purchase of land at the plant site to provide for future expansion and sludge facilities if they were to become necessary. The capital cost would be in the neighborhood of $1,000,000 and annual cost of $121,000.

5. Sludge disposal to the sanitary district without including land cost - Capital cost $185,000 and annual cost of $121,000.

Based on the above analyses the provision of sludge lagoons with separate treatment will be the most economical. It would be a distinct advantage as well as savings in cost to be able to discharge the waste activated sludge as proposed by Dr. Sawyer.

It is anticipated that 38 mgd will require treatment in facilities with the over-all cost of approximately $5,500,000. There apparently is to be no advantage to industry to build their own works under tax write-off benefits, etc. Dr. Sawyer estimated in the neighborhood of $45,000 per MG for treatment of the primary metal waste and $60,000 per MG for treatment of the phenol waste. It is proposed the plant will be built using G.O.B.s and revenue bonds. Mayor Sauget is concerned over their ability to sell revenue bonds. He is also concerned as to why they have to be first ahead of St. Louis, etc.

The question of Federal Grant was discussed. It was pointed out that $250,000 may be available with up to $500,000 available if pending legislation passes. The possibility of a double grant was discussed. This is not without precedent in other states. Since separate systems will be

provided it may be possible to apply one grant to the sewer separation interceptors, lift station and clarifier portion provided for the metal bearing waste and other grant applied to activated sludge treatment of the phenol bearing wastes. Every consideration will be given to a grant application. Mr. Klassen stressed that readiness was an important factor in establishing grant priorities. The next priority period will be July of 1961 dealing with the budget for 1961-1962. It was recommended that every effort be made to bring the project up to state of readiness and have an application in prior to that date in order to obtain full consideration under the 1961-1962 budget.

D. B. Morton
Sanitary Engineer

DBM:pm

cc - Mr. C. W. Klassen
- Dr. Clair M. Sawyer

Exhibit 87

MONSANTO CHEMICAL COMPANY

800 North Lindbergh Boulevard
St. Louis 66, Missouri

December 5, 1961

Mr. Jack K. Smith
Executive Secretary
Missouri Water Pollution Board
State Office Building
Jefferson City, Missouri

Dear Jack:

I heard a very disturbing piece of news today concerning the Mississippi River in the St. Louis area. Apparently Herb Clare from the regional office of the Public Health Service, Kansas City, ~~has stated~~ that they and the states of Missouri and Illinois have agreed on a phenol standard for the St. Louis metropolitan area. First, I would like to know if this is true, and secondly, I would like to present a plea from industry that we be consulted on this issue.

As you know, there is no technological data available that would allow for limits on phenol any lower than 200 to 300 parts per billion. The Ohio River Valley Water Sanitation Commission's industrial committees and Engineering Committee, composed of the public health engineers from each of the signatory states, searched for verification of the 2, 5 or 10 parts per billion limit. These people found no technical verification for this limit and on this basis, refused to establish a phenol limit in the Ohio River.

Since that time, the steel industry has done a great deal of technical work on phenols. The results of this work are overwhelming proof that phenol is not the causer of taste and odor complaints in most instances and that concentrations far in excess of what was previously assumed to be critical were necessary before taste was produced in receiving streams.

The disorderly processes established by the Public Health Service in the Missouri-Mississippi River area are well known among regulatory and industrial pollution control people throughout the country. The establishment of controls with no scientific justification would only continue this disorderly process. I know of no other place in the United States where such limits have ever been enforced.

At the same time, industry feels it should have an opportunity to present its case and the only technical data that has ever been produced concerning this problem. All of the work produced by the Public Health Service concerning this problem has utilized triple-distilled water as a basis. You and I know that the Mississippi River does not approach this type of water in any way.

Recent work done by the U. S. Steel Corporation, and presented in a paper at the last Federation meeting in Milwaukee, indicates that phenols in concentrations above 320 parts per billion are required at maximum chlorination rates to produce tastes in water comparable in pH to the Mississippi River.

We would be most happy to produce evidence in our own laboratories concerning this problem, but we are almost positive that this evidence will be classed as "biased."

In conclusion, I would like to say that industry feels it should have an opportunity to discuss limits of this type prior to any conferences, secret or otherwise, which seek to establish such limits with little or no information.

This is extremely disturbing news and I would appreciate a reply as soon as possible.

Very truly yours,

Jack T. Garrett
Industrial Hygienist
Medical Department

JTG:dh

MISSISSIPPI RIVER POLLUTION ABATEMENT
ST. LOUIS METROPOLITAN AREA

January 1962

(Preliminary, For Review Only, December 6, 1961)

The following policies regarding industrial waste discharges to the Mississippi River in the St. Louis Metropolitan Area will be adhered to by the Water Pollution Control Agencies of Illinois and Missouri:

1. Waste discharges will be evaluated on the basis of 45,000 cfs, St. Louis Market Street gage located at River Mile 179.6.

2. One-half of this flow or 22,500 cfs is considered to be allocated to each state. This division is accomplished naturally by river flow pattern below the mouth of the Missouri River in regard to effects of initial dilution.

3. The design of abatement works should be based on effluent requirements necessary to attain the desired stream quality objectives during critical low flow periods.

4. Adequate protection should be provided for these waters if the concentration of phenol or phenol equivalents does not exceed 5 parts per billion following initial dilution.

5. The cumulative effect of discharges to the Mississippi River permitted by either state will be evaluated from samples collected downstream following initial dilution. Initially, sample areas at Mile 168, below Jefferson Barracks Bridge, and at Mile 109.5, Chester, Illinois, will be utilized.

APPROVED

January 1962

Executive Secretary
Missouri Water Pollution Board

January 1962

Technical Secretary
Illinois Sanitary Water Board

Exhibit 88

Exhibit 88

VILLAGE OF MONSANTO

ST. CLAIR COUNTY, ILL.

PONDING MAP

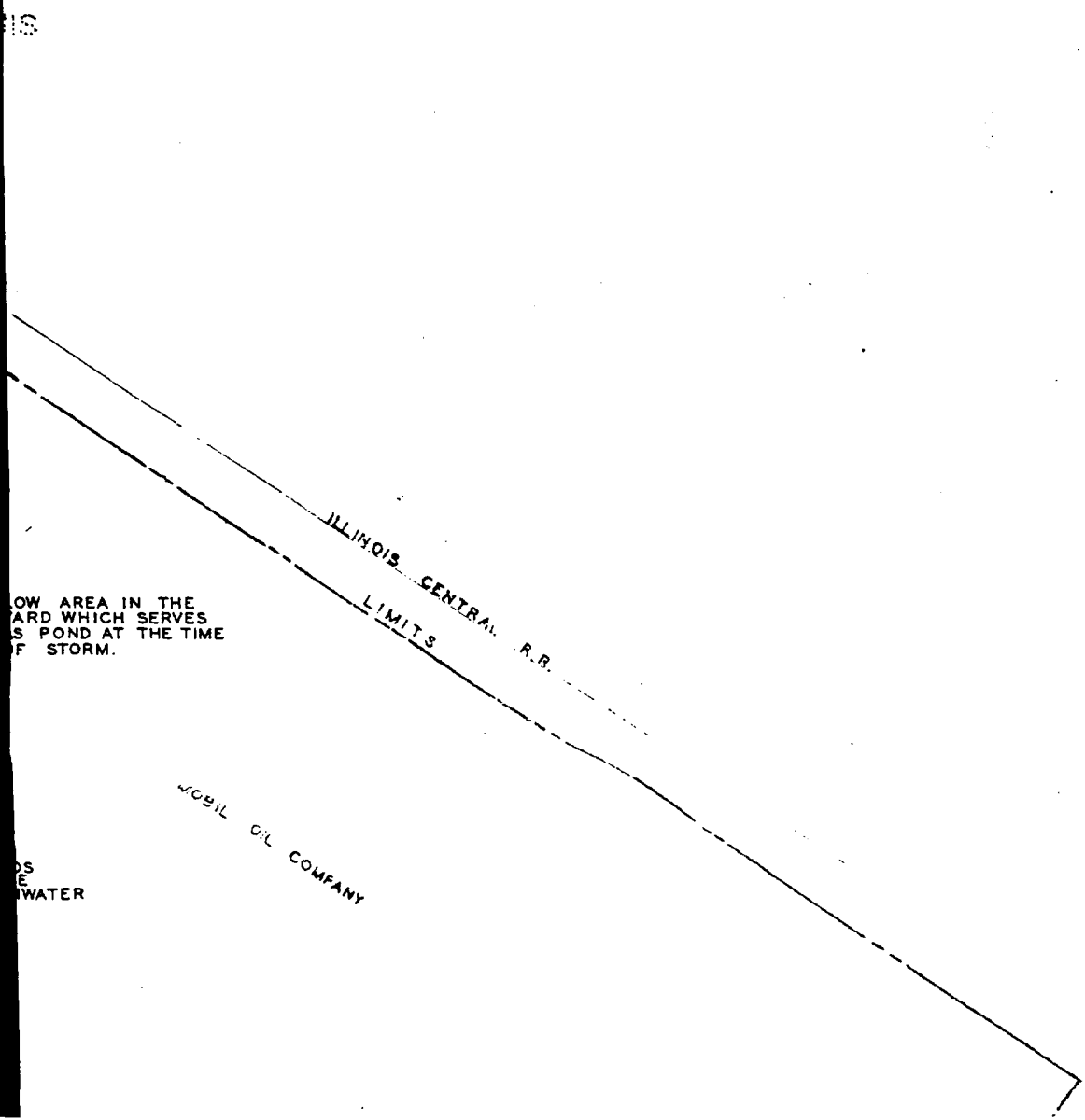


Exhibit 88

PLAN "C"
SEWER SYSTEM
VILLAGE OF MONSANTO
ST. CLAIR COUNTY, ILL.

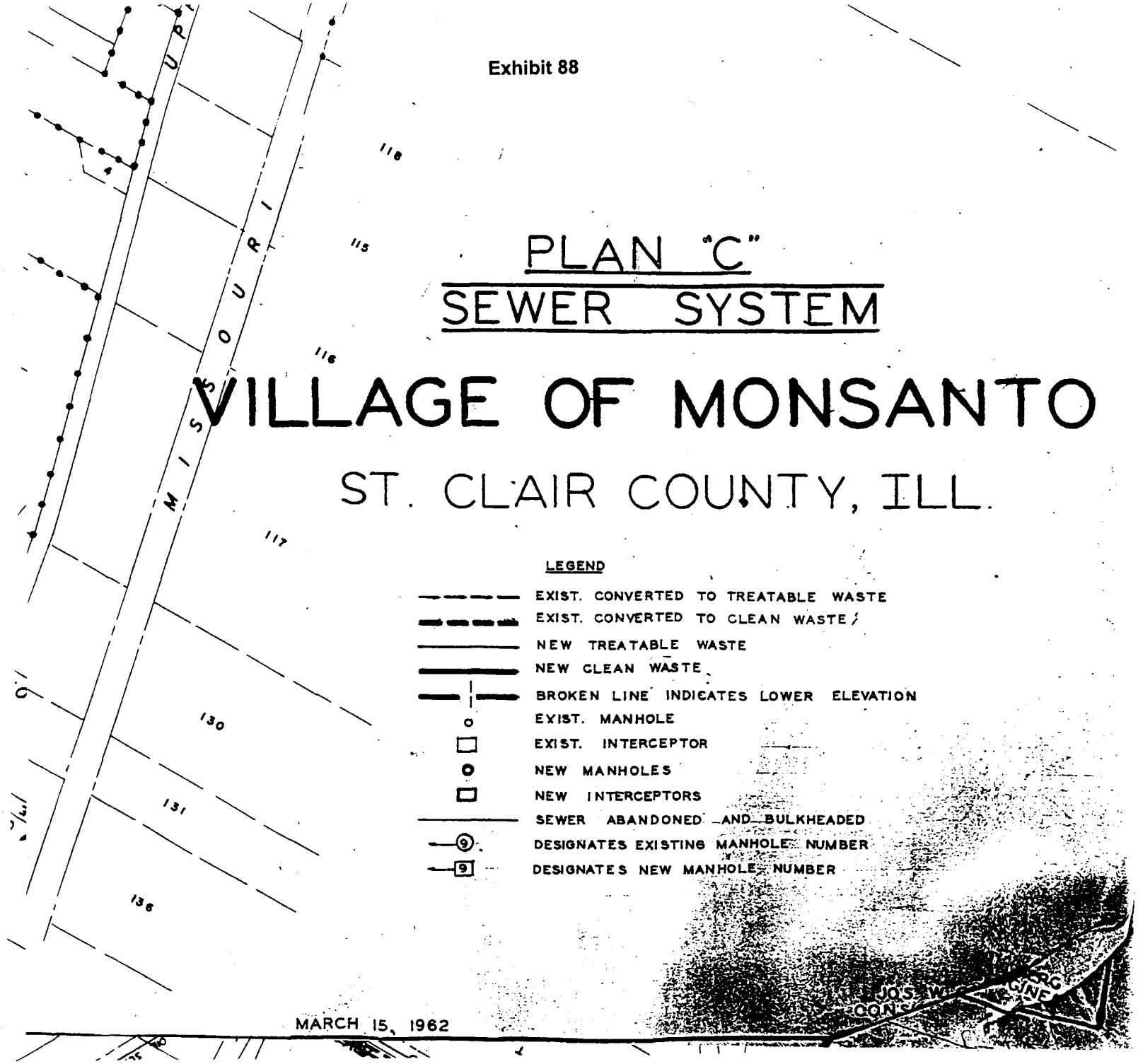


Exhibit 89

K. Dam

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE
REGION V
PUBLIC HEALTH SERVICE
433 WEST VAN BUREN STREET
ROOM 715
CHICAGO, ILLINOIS 60607

RECEIVED
JAN 31 1964
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

Mr. C. W. Klassen, Technical Secretary
Illinois State Sanitary Water Board
Illinois Department of Public Health
Springfield, Illinois 62706

Re: Federal Sewage Works Grant
WPC-Ill.-264

Dear Mr. Klassen:

A careful review of the data and information made available to us on the Monsanto waste treatment works project has been completed. Pertinent facets of the proposed project have been discussed thoroughly with those Departmental representatives having an interest in the project because of its location in a Federal enforcement area.

It is our collective opinion that the information presented leaves many questions unanswered. Based upon our review, there is considerable doubt that the proposed facilities will be able to accomplish the degree of treatment necessary to permit the effluent to be discharged to the Mississippi River under objectives agreed to by all parties concerned. In authorizing the expenditure of Federal money for a waste treatment project, we must be reasonably assured that the resulting plant effluent will comply with applicable discharge requirements. One of the present objectives for waste discharge was established by the Bi-State agreement. Utilization of goals is of paramount importance if water pollution abatement is to be achieved.

It is apparent that considerable activity has revolved around the design of the proposed plant. Equally apparent is the fact that much has been accomplished through in-plant controls and waste separation procedures. With these factors in mind, we are now in a position to give consideration to provisional approval of the project plans and specifications. Such approval would be based on a demonstration, once the project is in operation, that the treatment that is effected constitutes sufficient benefit to the receiving stream to justify Federal participation.

Any provisional approval of the project plans and specifications will be subject to the condition that no grant payment will be made until after the project is placed in operation and satisfactory technical evidence is submitted to show that the plant effluent is in compliance with applicable waste discharge requirements.

At the present time, this would require that:

1. The total phenol content of the plant effluent not exceed 245 pounds per day, or such other amount as will not contribute to an average phenol concentration in excess of 2 ppb in the Mississippi River between Illinois and Missouri in the St. Louis Metropolitan Area,

2. The sludge lagoons provide effective settling and handling, without danger of overflow, of the sludge load placed on them, as indicated in the September 21, 1963, Engineering Design Report in which it is stated that "two 20-acre lagoons will be constructed which will provide more than enough volume for sludge storage."

3. The suspended solids of the waste be reduced by at least 50 percent.

4. The COD of the waste be reduced by at least 30 percent.

5. Essentially all of the floating solids and scum be removed.

If you have any questions or comments, please let us know.

Very truly yours,

H. W. Poston

H. W. Poston
Regional Program Director
Water Supply & Pollution Control

EC Budget
approved

RECEIVED
SEP 15 1964
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

September 11, 1964

Controlling letter re PL 660 Grant

Honorable Leo Sauget
Mayor, Village of Monsanto
Village Hall
Monsanto, Illinois

Sewage Works Grant
WPC-Ill.-264

Dear Mayor Sauget:

Our review of the plans and specifications for the Village's proposed waste treatment works project has been completed.

The plans and specifications are hereby provisionally approved. The approval is subject to the condition that no Federal grant payment will be made until after the project has been completed and placed in operation and satisfactory technical evidence has been submitted to show that the effluent is in compliance with the following discharge requirements:

Revised from Provisional Approval of Jan 29, 1964.

1. The phenol content of the plant effluent shall be limited to that amount which will not contribute to a monthly average phenol concentration in the Mississippi River between Illinois and Missouri in the St. Louis Metropolitan Area in excess of 2 p.p.b. and a maximum of 5 p.p.b. at any point in these waters following initial dilution, or such other limitation as may be mutually acceptable to the States of Illinois and Missouri, and the Department of Health, Education, and Welfare.

2. The sludge lagoons provide effective settling and handling, without danger of overflow, of the sludge load placed on them, as indicated in the September 21, 1963, Engineering Design Report.

3. The suspended solids of the waste be reduced by at least 50 percent.

4. The COD of the waste be reduced by at least 30 percent.

5. Essentially all of the floating solids and scum be removed.

In the event of the submission of the technical information necessary to provide reasonable assurance of conformance with the above requirements, there would be no objection to the approval of grant payments prior to project completion, if the Village is otherwise eligible.

It is expected that you will take the necessary action to insure sufficient testing and laboratory controls to at least demonstrate compliance with the above discharge requirements. Unless we hear from you to the contrary in the immediate future, we shall assume these important elements of plant operation and maintenance are being properly handled.

One set of the provisionally approved plans and specifications is being returned to you under separate cover. This set should be kept readily available during and after the actual project construction.

This letter constitutes authorization to advertise for bids consistent with the provisionally approved plans and specifications. Please let us know as soon as a bid date is fixed.

If we can be of any assistance in the meantime, do not hesitate to contact us.

Very truly yours,

Hugh Poston

File Monsanto Village

Monsanto
COMPANY

RECEIVED

FEB 25 1966
DIVISION OF SANITARY ENGINEERING
ILLINOIS DEPT. OF PUBLIC HEALTH

Monsanto, Illinois 62201
(618) BRidge 1-5835

February 23, 1966

Mr. Clarence W. Klassen
c/o Illinois Sanitary Water Board
New State Office Bldg.
Springfield, Illinois

Dear Clarence:

Here is a copy of the article for the Oil and Gas Journal which should appear in their March 28 issue. Not included here is an aerial picture of the Village which I believe they can use.

In the article, I tried to minimize discussion of anything which might affect our application for federal aid. We did not elaborate on technical details or on the in-plant reduction work. These will make interesting papers after the federal aid problem is settled.

Sincerely yours,

Paul

Paul B. Hodges

/gs

enclosure

ECB File Monsanto Village 2/25/6

AN EXAMPLE OF MUNICIPAL-INDUSTRY COOPERATION IN WASTE TREATMENT

Introduction - This paper tells the story of how municipal officials and local manufacturing firms worked together to solve problems of waste control and treatment in the Village of Monsanto, Illinois. The Village is a predominantly industrial community located southwest of E. St. Louis, Ill. along the eastern bank of the Mississipp opposite St. Louis, Missouri (See Figure #1).

As waste treatment became necessary in the greater St. Louis Area, local officials and the companies collaborated in investigation work, in-plant reduction of wastes and design and construction of treatment facilities which are being built and will be owned by the Village. Finally, a not-for-profit corporation formed by the industries has contracted with the Village to manage the operations, thereby fixing responsibility for successful operation squarely with the industries which produce most of the wastes. All parties concerned believe that this operational arrangement will be efficient and economical, will relieve the Village officials of a problem which may become highly technical in nature and will provide maximum benefit to the Mississippi River at a reasonable cost to the municipality and to its industries.

Background - The Village of Monsanto commenced about World War I as a group of heavy Manufacturing companies, around which small resident areas grew up. The need for community services became evident, so in 1926, the Village was organized as a municipality, with Leo Sauget as Mayor. It is interesting that Mayor Sauget is still serving in that capacity 40 years later, believed to be the U. S. record for continuous service in a mayorality.

A number of factors have combined to make the area a favorable one for industrial growth. The principal factors are:

(1) Proximity to St. Louis, Mo. and E. St. Louis, Ill., with their skilled labor supply market.

(2) Availability of river and extensive railroad transportation facilities.

(3) A large supply of available ground water for cooling and processing.

(4) Last, but not least, the favorable political climate created by the successive Village Boards of Trustees under the leadership of Mayor Sauget.

The major companies located in the Village and connected to the Village sewerage system are (See Figure #2):

(1) Refinery of the Mobil Oil Company

(2) Electrolytic zinc production plant of the American Zinc Company of Illinois

(3) William G. Krummrich Plant of Monsanto Company - heavy chemicals production

(4) Rubber reclaiming plant of Midwest Rubber Company

(5) Copper reclamation and tubing production plant of Cerro Copper and Brass Company

(6) Steel castings plant of Sterling Steel Castings Company

(7) Fertilizer plant of Darling and Company

The residential population of the Village has remained at the 250-300 level, but the number of people employed by the industries has risen to about 4500.

A sewer and drainage system and a pumping station were provided in the early 30's and have been periodically expanded as necessary to meet the growing needs. Wastes were discharged into the Mississippi River normally without treatment - a practice general in the area and acceptable because of the huge water flow in the river (the Miss. River at St. Louis drains about one-fourth of the land area of the U.S.). However, a survey during the early 50's showed that the river sout of St. Louis was gradually deteriorating aesthetically and as a recreational area. In-plant waste reduction and control programs were instituted in several of the plants (Ref. #1).

In 1960, the Village retained Metcalf and Eddy, Engineers to define needs for waste treatment. Based on the size and characteristics of the waste load then existing, a proposal was made for segregated primary treatment of some of the waste streams plus biological oxidation of the wastes from the oil refinery and chemical plant (Ref. #2).

Acting together, the Village and the companies requested and were granted time for additional study and for further implementation of their waste reduction programs. By mid-1962, very significant reductions were accomplished, e.g. reduction of COD (general waste load) by one-half and reduction of phenolic discharges by two-thirds. These reductions were made by major efforts and large capital expenditures by the industries. It was also apparent that, with additional time, additional reductions could be accomplished which would approach the overall reduction expected from ordinary biological waste treatment. Based on expected reductions of two-thirds in COD discharged and over ninety percent in phenolics, approval was given to proceed with primary waste treatment - removal of floating oils and settleable solids.

Description of Waste Treatment Facilities

Metcalf and Eddy prepared design for the primary treatment facilities (Ref. #3). Unusual problems in design were encountered due to the low pH (2.0-3.5) of the combined wastes (Ref. #4). Corrosion problems were minimized by use of vitrified clay tile (42") for conduits, glass reinforced polyester lining for concrete structures and use of bronze or #316 stainless steel for exposed metal. The settling basins are sloping earthen walls lined with asphaltic membrane with "Acidbar" treated wood structural members. Sludge scrapers and scum collectors are of the traveling-bridge type with all immersed parts of #316 stainless steel. Sludge piping, scum trough and scum collection tank, overflow weir, slide gates, etc., are glass reinforced polyester.

Sludge collected is pumped to one of two lagoons, shallow enough to permit complete freezing under normal winter conditions in the area. Upon freezing, the sludge dewaters and can be readily moved to land-fill areas provided. The two lagoons are used in alternate years. Unlike ordinary "domestic type" wastes, the solids collected are inoffensive, with little odor.

Total cost of the waste treatment project is $1.3 million plus land costs. Facilities are designed to adapt to higher degrees of treatment when the need becomes evident. Start-up is scheduled for late April, 1966.

Organization for Waste Treatment

Several examples of unusual arrangements between municipalities and industries (or groups of industries) for joint treatment of wastes have been described in publications. In Reference #5, A. B. Cherry outlines the joint waste treatment arrangement between the American Cyana

Organization for Waste Treatment

plant at Bound Brook, New Jersey and the Somerset-Raritan Valley Sewerage Authority. Here the company is providing biological treatment for the "domestic type" primary effluent from the Authority on an "out-of-pocket" cost. In turn, the company gains from the nutrients and supply of bacteria contained in the primary effluent, thus aiding treatment of its complex chemical waste.

References #6 and #7 describe the joint venture between the City of South Charleston, W. Va. and the Union Carbide Chemical Co. The city owns the plant which was designed and built by Carbide on land donated to the city by Carbide. Carbide operates the plant through a wholly owned subsidiary corporation. As in the example above, the city is receiving waste treatment at a cost lower than normal and Carbide is receiving benefits of the nutrients plus tax advantages of the municipal ownership.

Because of the unusual preponderance of industrial wastes in the Monsanto Village combined sewage plus the unusual combination of metallic and chemical type industrial wastes, plans for organization of waste treatment required extensive study. The companies wanted combined, rather than individual, waste treatment because separation from the Village sewerage system would have been very costly and because of the economies in having a single, rather than multiple, waste treatment installation. The companies also desired municipal financing and ownership of the treatment facilities to avoid tying up their own capital funds in non-earnings projects and to gain the low interest rates possible through issuance of municipal tax-free bonds. By consensus, the municipal officials and the industry leaders agreed to proceed with combined waste treatment with the Village

building and owning the facilities, with technical guidance from the industries. Accordingly, a "Mayor's Technical Advisory Staff" was appointed from the industries to assist and advise the municipality. This group conferred with the engineering consultants during the design phase of the work.

For operation of the facilities, (particularly whenever biological treatment becomes necessary), industrial supervision appeared to offer mutual advantages to the Village and its industries for these reasons:

(1) What the industries discharged would determine the characteristics of the waste to be treated and the ease and effectiveness of the treatment. It followed, therefore, that the industries should somehow assume responsibility for the treatment.

(2) Because of the complex and variable nature of the waste, close liaison would be needed between the waste treatment plant and the industries. Having the industries operate the plant would offer the shortest possible lines of communication.

(3) Treatment of the complex waste would offer complex technical problems. The larger companies could easily call on their technical staffs for guidance. The Village would have difficulty in managing operations of this complexity.

(4) Since the industries would be paying nearly all of the costs of the operations, they should somehow be involved in the allocation of charges to help assure equity.

Discussions among the companies and municipal officials on how to organize to handle industrial supervision of operations began in mid-'61. Monsanto Company was authorized to develop proposals for discussion. This they did, through their Legal Dept., a legal consultant and the local

plant management. Numerous conferences of the plant managers and with the Village Board of Trustees were held to work out details to the satisfaction of all of the parties and their legal staffs. The agreements concluding the negotiations were signed in early 1966.

Description of the "Not-For-Profit" Operating Corporation

Consensus was achieved in mid-1965 to proceed with industrial operation via a "not-for-profit" corporation with representation from the Village and the industries. This corporation would then contract with the Villag to operate the waste treatment facilities.

Accordingly, in July, '65 a Delaware Charter was issued to the "Village of Monsanto Sanitary Development and Research Association" (called the "Association"). By-laws (and motions) adopted at its first meeting provide:

(1) The affairs of the Association are managed by its Board of Directors. Members of the Board are appointed by the participating companies plus an appointment by the Village of Monsanto. In principle, a company's representation on the Board of Directors is roughly proportional to its share of the expected costs of operation.

(2) The Board of Directors meet bi-monthly to conduct business of the Association. Between meetings, the Association is managed by an Executive Committee. Of course, limitations are placed on the powers of the Executive Committee.

(3) A Finance Committee, with one member appointed by each of the participating industries plus a Village representative, serves in an advisory capacity in matters relating to expenditures, allocation of costs, auditing of records, etc. Each representative on the Finance Committee functions as a "watchdog" for his company with full access to records of the corporation.

(4) Provisions are made for altering representation on the Board of Directors to meet changing conditions. For example, a company moving into the area and wishing to participate in affairs of the Association can be voted into membership and will be entitled to appoint one or more Directors.

In mid-January, '66 a 30-year contract was executed between the Village and the Association. Main features of the contract:

(1) The Village consults the Association (and the Association advises) in all matters relating to control and treatment of sewage. The Association approves selection of engineers and design for any future additions to the treating plant. Following approval, the Village agrees to proceed with construction.

(2) The Association operates and maintains the treating plant, including purchasing of supplies and services, hiring and firing employees, etc.

(3) Financing of operating costs is handled as follows:

a. The Association advises the Village (by the 5th of each month) of the costs for the preceding month and the percentage of the total bill to be charged to each user (note - these percentages are to be determined by periodic waste surveys conducted by the Association)

b. The Village bills each user for their share of the total cost and repays the Association by the 25th of the month. The principal users have contracted to pay their share as part of the agreement. The Village agrees to collect no more money than is necessary to pay the Association.

c. The Village has advanced to the Association an interest free loan to cover start-up expenses and the regular one-month's lag between time of expenditure and reimbursal by the Village. The loan is to be repaid over a 12-month period following start-up by extra charges to be added to each user's monthly bill.

Summary

This article has described the cooperative approach toward waste treatment taken by the Village of Monsanto, Illinois, and its industries Following close working together to define needs and to effect very substantial waste reductions, the Village is now building waste treatment facilities. These facilities and (any future additions during the life of the agreement) will be operated by the industries, working collectively through a not-for-profit corporation. This arrangement, with the spirit of cooperation that made it possible, should provide the Village with adequate waste treatment at minimum cost and should be a real asset to the Village and its industries in their continued growth and development.

Paul B. [redacted]dges

/gs

References:

(1) "Waste Sampling and Flow Measurement for In-Plant Control" by Paul B. Hodges. Proceedings of the 10th Ontario Industrial Waste Conference, June, 1963.

(2) "Report Upon Waste Water Treatment for the Village of Monsanto, Illinois dated 11/3/60 by Metcalf and Eddy Engineers.

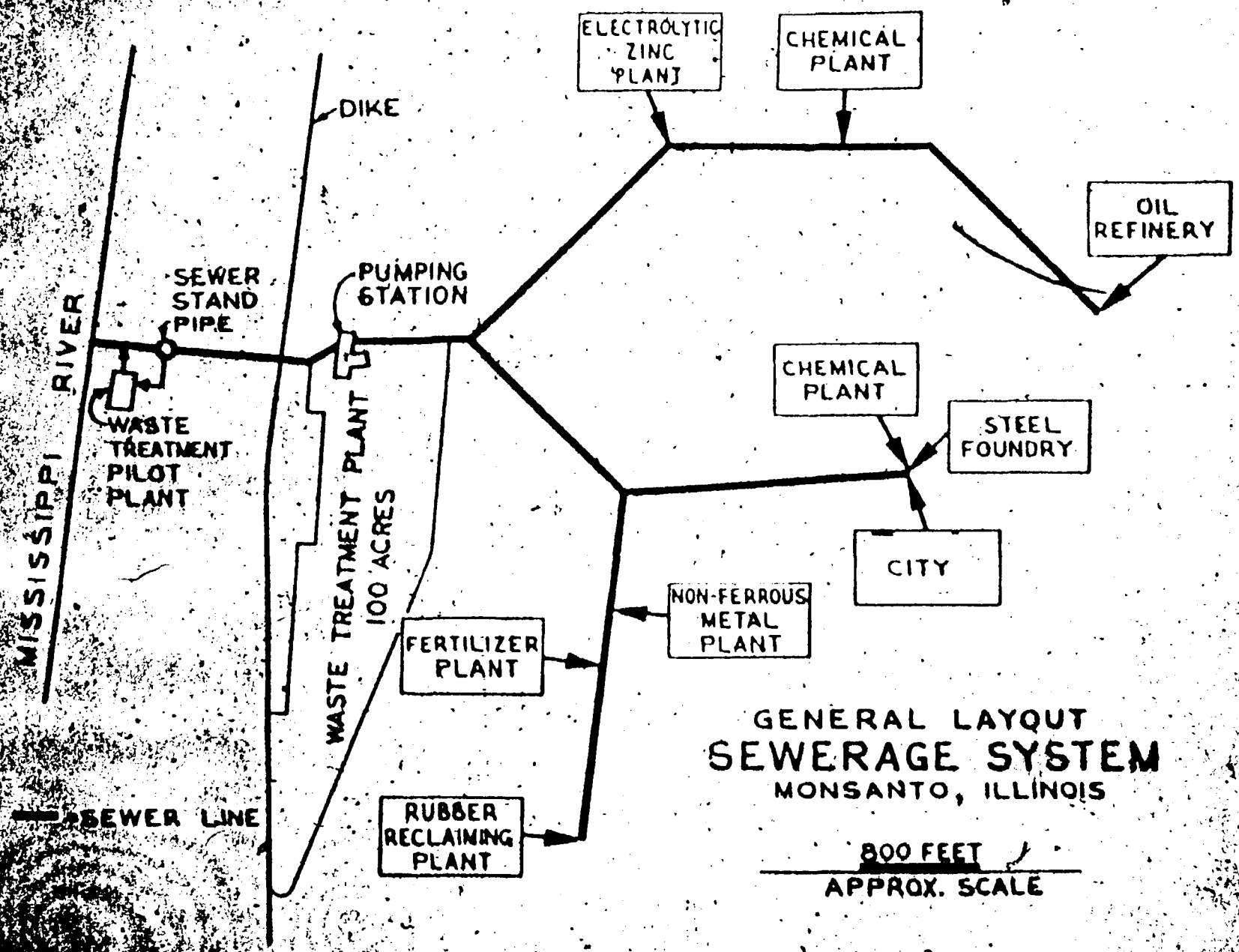
(3) "Design Report Upon Waste Water Treatment for the Village of Monsanto, Illinois" dated 9/21/62 by Metcalf & Eddy, Engineers.

(4) "Materials of Construction Tested for Chemical Plant Waste Disposal Facilities" by Oliver W. Siebert. Published in "Corrosion" Vol. 17, No. 11, November, 1961.

(5) "Biological Treatment of a Complex Chemical Waste By American Cyanamid Company" by Alfred B. Cherry. Presented by the Southeastern Regional Meeting of the American Chemical Society, Richmond, Virginia, November, 1959.

(6) "Solving South Charleston's Waste Problems Through the Combined Approach of City and Industry - Part I", by Goerge P. Schrader. Presented at Federation of Sewage and Industrial Wastes Meeting, Dallas, Texas, October, 1959.

(7) "City - Industry Cooperation Solves Pollution Problem" - Engineering News-Record, May 9, 1963. Pages 32-34 incl.



GENERAL LAYOUT
SEWERAGE SYSTEM
MONSANTO, ILLINOIS

Exhibit 90

Monsanto
Enviro-Chem
Systems Inc
10 SOUTH RIVERSIDE PLAZA · CHICAGO, ILLINOIS 60606 · 312 782 [illegible]

May 24, 19[illegible]

Village of Sauget Board
of Trustees
2987 Monsanto Avenue
Sauget, Illinois 62206

Attention: The Honorable Paul Sauget
President of Board of Trustees

Gentlemen:

In accordance with the proposal dated 6/25/70 to the Village of Sauget, we submit herewith a report of our test work and preliminary process engineering design of a waste treatment facility for the Village wastewaters. The specific items contained herein include:

(1) Analyses of existing Village waste stream and individual waste sources.

(2) A description of laboratory and pilot plant studies.

(3) Recommendations for "in-battery limits" modifications in waste discharge.

(4) Preliminary process flow diagram.

(5) A preliminary plot plan.

(6) Forecast composition of influent and effluent from proposed treatment plant.

(7) Discussion of areas most likely to yield grants.

In fulfillment of our agreement Monsanto Enviro-Chem also submitted three previous reports entitled:

(1) Flow Measurement Report - December 22, 1970

(2) Report Upon the Operation and Physical Condition of the Village of Sauget Primary Treatment Facility - January 4, 1971

(3) Preliminary Laboratory and In-plant Studies - July 20, 1971

After completion of the detailed process design, Monsanto Enviro-Chem will forward an addendum to this attached report which will contain:

(1) Capital cost estimate for proposed new treating facilities and modifications to primary plant and sewer modifications.

(2) Proposed rate schedule formula for determining fees to be paid by each contributing company.

Upon [redacted] above described addendum, Monsanto Enviro-Chem shall have completed all work authorized by the Village of Sauget in Paul Sauget's letters of July 6, 1970 and August 26, 1970 referring to this proposal dated May 28, 1970 and revised June 25, 1970.

Cordially,

MONSANTO ENVIRO-CHEM SYSTEMS, INC.

J. L. Jones

J. L. Jones
Engineering Services Manager

W. J. Fahrner

W. J. Fahrner
Process Engineer

Bruce C. Davis

B. C. Davis
Process Engineer

JLJ/jf

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Recommendations	20

INTRODUCTION

[illegible] Phase I of the Village of Sauget Water Pollution Abatement Program in August of 1970.

On July 1, 1970 the State of Illinois Environmental Protection Act went into effect. Under this act the Environmental Protection Agency, the Pollution Control Board, and the Institute for Environmental Quality were established.

The water standards to be met at the time Enviro-Chem began the Phase I study were outlined in the Sewage and Industrial Waste Treatment Requirements and Effluent Criteria (Technical Release 20-22, Second Edition-1968 from the Illinois Sanitary Water Board) and the Water Quality Standards for Interstate Waters Between Illinois and Missouri (Rules and Regulations SWB-13-1967).

On December 4, 1970 the Pollution Control Board announced hearings to be held on proposed state-wide water effluent criteria.

On January 6, 1971 the Board unanimously adopted R70-3 which moved up the completion date for secondary treatment along the Mississippi River to December 31, 1973.

R70-8 (Effluent Criteria) (October 1970) was first revised on February 8, 1971 after three public hearings. Changes involved dilution water, more stringent metals criteria, phosphorous and nitrogen.

In #R71-14 on May 12, 1971 the Board adopted another more complete set of Proposed Water Quality Standards Revisions and Effluent Criteria.

On December 5, 1971 the Board published another revision to effluent criteria and the proposed final draft of Water Pollution Regulations on December 21, 1971.

During January and February of 1972 the Water Quality Standards and Effluent Criteria were adopted - 13 months after Enviro-Chem had begun the study to determine a scheme of treatment to solve the Village's wastewater problems.

Because of the many changes in the proposed criteria, both the Village of Sauget and Enviro-Chem have been required to expend additional time and money to arrive at a system to reduce the water pollution levels at Sauget. In August of 1971 the Village contracted Enviro-Chem to evaluate alternative wastewater collection and treatment systems because of the proposal requiring treatment of all water in combined sewers to meet proposed effluent criteria. Two reports were issued by Enviro-Chem, one on October 15, 1971 and the second on December 31, 1971.

During 1971 the Village presented testimony at Evanston on 3/26, at Carbondale on 6/30, at Peoria on 10/6, Sauget on 11/8, and Chicago on 12/15 describing the work that had been done by the Village and their consultants. This testimony included opinions on technical feasibility of certain criteria as well as capital cost and operating cost estimates.

Because of the delays caused by additional work required by changing criteria, the Phase I report is being issued in essentially complete form slightly over three months behind the schedule proposed in June of 1970.

OBJECTIVES

MONSANTO ENVIRO-CHEM SYSTEMS, INC. agreed to provide to the Village of Sauget the following items in the course of studying the Village waste water problems:

1. Analysis of each contributing waste stream and of the combined streams as they are fed to the existing primary treating plant, showing all important contaminants and the range and variations in flow rates.

2. Proposed composition of the effluent stream from a new treating plant, showing residual amounts of all important contaminants.

3. A process flow diagram and description of how the existing treatment plant will be utilized.

4. A plot plan showing the arrangement of components and the amount of land required.

5. A complete technical report of laboratory and prototype plant studies including:

   a. a description of the equipment and operating plan
   b. batch treating rates
   c. effluent characteristics at various prototype plant detention times
   d. results of pretreatment studies
   e. frequency distribution analyses of important raw waste characteristics
   f. recommended plant design factors.

6. Recommendations for "in-battery limits" modifications by various contributing plants where these will result in better over-all economics.

7. Proposed rate schedule formula for determining fees to be paid by each contributing company.

8. Recommendations for areas most likely to yield federal grants and a description of procedures.

9. Capital cost estimate for proposed new treating facilities and modifications to primary plant and sewer modifications.

SUMMARY OF RESULTS

The following summary of results for the on-site pilot plant study and associated test program conducted for the Village of Sauget evaluate possible process alternatives and determine necessary design parameters. The first section of this summary will describe the results from the study pertaining to the recommended preliminary process design, the second section will deal with the process alternatives investigated but not recommended in the preliminary design.

Section One - Preliminary Process

A. Village Waste Flows Observed (June - August 1971)

Based on on-site observations at the Village treatment plant, the following data summerizes the waste flow rates, average peak and duration of peaks.

1. The average waste flow is 18 MGD.

2. On approximately 86% of the 92 days of observation, flow peaking was less than 1/4 hour in duration and random.

3. On 14% of the 92 days of observation, flow peaking occurred for a duration of greater than 1/4 hour but less than six hours.

4. On 3% of the 92 days of observation, flow peaking of greater than 1/4 hour duration can be attributed to rainfall.

5. On 3% of the 92 days of observation, flow peaking of greater than 1/4 hour occurred randomly.

6. On 8% of the 92 days of observation, flow peaking of greater than 1/4 hour occurred between the hours 8 AM and 12 noon during the period of Monday through Friday.

7. Maximum peak flow observed during dry weather period was 32 MGD which was approximately 80% over the monthly average flow. The duration of this peak was 1/4 hour.

8. Maximum duration of a peak above the monthly average observed during the dry weather period was six hours. The flow was 24 MGD which was approximately 30% above the average flow.

9. Daily average flow was at a minimum on Sundays.

B. Storm Water Storage and Clarification

A system to collect "first flush" storm water for complete treatment and for clarification of excess storm flows was studied.

1. The storm water storage capacity, based on containing the "first flush" storm flow, is 800,000 gallons.

2. The excess storm flow clarification system design is based on an overflow rate of 2,000 gal/day-ft^2 and a maximum estimated sewer capacity of 128.5 cfs for the existing sewers.

C. Grit Chamber

An average volume of 260 cubic feet per day and a maximum of 520 cubic feet per day were determined from the volumes demucked and frequency of the demucking of the present facility.

D. Neutralization/Precipitation

Lime treatment will be necessary for reducing acidity, removal of heavy metals and suspended materials

1. The acidity of the present 1971 Village waste stream was determined by five methods. Of the widely diverging values, 250,000 to 275,000 pounds of acidity per day as $CaCO_3$ was determined to be the best representation of the waste lime requirements during pilot plant operations.

2. High calcium quicklime was chosen as the best neutralizing agent based on technical feasibility, availability, reaction time, cost and sludge characteristics.

3. Treatment of the raw waste with high calcium quicklime removed heavy metals to levels consistently less than the adopted state standards.

4. Treatment of the raw waste with high calcium quicklime does not remove a significant amount of the soluble BOD_5, COD, or color at high lime dosages greater than 1,000 mg/l.

5. Lime usage in the pilot plant was approximately twice the value expected from acidity measurements taken by the treatment plant with semi-continuous non-flow proportioned samples.

6. Possible errors in treatment plant measurements, precipitation of metals, scrubbing of CO_2 from the air, probable errors in lime usage measurements, and inerts as impurities in the lime purchased could account for about 50% or more of the increase lime usage observed in the pilot plant.

7. Average lime delivery capacity should be available to deliver 112,000 lbs CaO/day which is twice the amount required based on predicted acidity values of 100,000 lbs/day as $CaCO_3$ for 1974.

8. Maximum lime delivery capacity should be available to deliver 357,000 lbs CaO/day which is 1.5 times the amount required based on predicted maximum acidity values of 425,000 lbs/day as $CaCO_3$.

9. Maximum instantaneous lime delivery capacity will be [illegible] lbs CaO/day.

E. Coagulation and Flocculation

Suspended solids removal is not adequate without the addition of polyelectrolytes. Based on extensive batch testing of [illegible] available flocculating aids, Atlas [illegible] was found to produce the lowest effluent suspended solids. During pilot plant testing, Atlas [illegible] was applied at an average concentration of 0.5 mg/l producing an effluent suspended solids level of [illegible] mg/l without sludge recycle, and 42 mg/l with sludge recycle.

F. Clarifier Design

An overflow rate of 500 gal/ft²/day was selected based on engineering judgement. Tests indicated that at an effluent suspended solids concentration of less than 50 mg/l, the SS concentration was independent of overflow rate. Use of an overflow rate of 500 gpd/ft² will allow utilization of the existing clarifiers for a significant capital cost savings.

G. Sludge Handling

During pilot plant work, sludge generation rates were monitored and work was conducted to evaluate sludge conditioning, thickening, vacuum filtration, centrifugation and sludge disposal.

1. A solids balance was maintained on the pilot plant system exclusive of grit. The sludge generation was approximately 0.7 lbs sludge generated/lb CaO added.

2. Sludge solids coming into the system in the raw waste and removed will be approximately 20,000 lbs/day.

3. Atlas 105C, a sludge conditioning agent, showed low reduction (50%) in specific resistance to filtration at a dose rate of 14 lbs/ton sludge.

4. Thickening experiments indicated that thickening is not economically attractive for the 8% solids from the clarification step.

5. Eight per cent sludge can be concentrated to 30% by weight by vacuum filtration with the following conditions:

   Filter Media - Mapped Cotton
   Filter Porosity-30 cfm at 0.5 in H_2O
   Loading - 2.0 lbs/ft^2-hr at 15" Hg - applied vacuum
   Filtrate Solids - 40 mg/l

6. With a feed solids concentration of 2% and a liquid retention time of approximately 1.5 minutes, 92% solids capture was achieved by centrifugation, with a cake solids concentration of 25 to 30% by weight. No chemicals were added for sludge conditioning.

7. Concentrated sludge solids, 25% or greater, should be disposed of by landfill.

H. Floating Debris, Visible Oil Scum

1. From 5 to 10 ft^3/day of floating debris should be removed daily in the trash racks.

2. From 500 to 700 ft^3/day of water and floating scum and oil should be removed from the system for decanting and disposal of scum.

I. Overall Performance of Chemical Treatment System

Based on pilot plant data, the expected performance of a chemical treatment system for the Village of Sauget waste (1971 contaminant loads), 1974 + flows have been summarized in the attached Table.

TABLE 1

SUMMARY OF
STATE OF ILLINOIS EFFLUENT
CRITERIA TO BE MET BY PROPOSED
CHEMICAL TREATMENT SYSTEM

Item	In Compliance	Out of Compliance
Settleable Solids	X	
Floating Debris	X	
Visible Oil	X	
Grease	X	
Scum	X	
Sludge Solids	X	
Color		X
Odor		X
Turbidity		X
Arsenic (Total)	X	
Barium (Total)	X	
Cadmium (Total)	X	
Chromium +6 (Total)	X	
Chromium +3 (Total)	X	
Copper (Total)	X	
Cyanide		X
Fluoride (Total)	X	
Iron (Total)	X	
Iron (Dissolved)	X	
Lead (Total)	X	
Manganese (Total)	X	
Mercury (Total)		X
Nickel (Total)	X	
Oil (Hexane Soluble or Equivalent)		
pH	X	
Phenols		X
Selenium (Total)	X	
Silver	X	
Zinc (Total)	X	
Total Suspended Solids		X
Total Dissolved Solids		X
Bacteria		X?
BOD_5		X

CONCLUSIONS

The conclusions are presented in the same format as the Summary of Results.

Section One - Preliminary Process

A. Plant Flows

1. Based on 1971 observations, flow peaking does not occur on any specific day or during any specific time period during a day.

2. Based on 1971 observations, peak flows during dry weather for short durations (approximately 1/4 hour) may exceed the average by as much as 80%.

3. Based on 1971 observations, peak flows during dry weather for periods greater than 1/2 hour will no exceed the average flow by more than 25%.

4. Based on 1974 predicitions by the Village, maximu peak flows during dry weather periods will be about 50% above the average for a maximum duratio of four hours.

5. With projected flow reductions, the magnitude of duration of expected flows relative to the averag flow will increase. The predicted 1974 flow will govern plant design rather than the 1971 observations. Treatment plant design flow will be 11. MGD based on treatment of process wastes and "fir flush" storm flows.

B. Storm Water Storage and Clarification

1. "First flush" treatment plus process surge capaci will require 800,000 gallons and 300,000 gallons respectively for 1974 + flows.

2. All storm water will receive at least clarification based on a calculated maximum sewer capacity of 128.5 cfs.

C. Grit Removal

1. To prevent grit build up in the system, a removal system should be installed before neutralization, flocculation and clarification.

2. Economics dictate that grit chambers should be above grade after the pumping station rather than in front of the existing station.

D. Neutralization Precipitation

1. State effluent criteria [illegible] mercury can be consistently [illegible] treatment of the [illegible] pH of between [illegible]

2. Treatment [illegible] sedimentation [illegible] adopted criteria for [illegible] cyanide, mercury, phenols, total suspended solids, and total dissolved solids [illegible]

3. With changes in concentrations of substances because of the reductions, dolomitic lime, as an alternative neutralizing agent, should be given careful consideration during the detailed process design. Dolomitic lime could reduce sludge volume and scale formation.

E. Coagulation & Flocculation

1. A coagulation and flocculation step will be required prior to clarification in order to achieve maximum effluent clarity and minimum suspended solids content.

2. Atlas 2A2 anionic polyelectrolyte was shown from extensive testing to produce an effluent of the highest quality.

F. Clarification

1. An overflow rate of 500 gal/day/ft^2 should be used for design of the clarifiers.

2. Clarifier sludge recycle to the head of the chemical treatment system does not appear to improve effluent quality.

3. Prediction of the exact suspended solids level from the clarifiers is impossible at this time because of proposed changes in the Village waste in 1974+. Suspended solids levels may not be below the 25 mg/l level.

G. Sludge Handling

1. Because of discrepancies between theoretical and actual lime requirements for neutralization and an unexplainably high content of $CaCO_3$ in the sludge, sludge handling capacity should be based on a generation rate of 0.7 pounds sludge per pound CaO used for a lime usage of 1.5 times the predicted acidity - 84,000 pounds CaO, approximately 59,000 pounds sludge per day.

2. Suspended solids requiring removal in the raw waste will be about 20,000 lbs/day.

3. Sludge concentration from the clarifier will be about 8% by weight and no gravity thickening operation will be required before final concentration.

4. Concentration of the clarifier sludge will be accomplished by vacuum filtration because of better solids capture and ease of operation.

5. No sludge conditioners will be required for the vacuum dewatering operation.

RECOMMENDATIONS

1. The Village of Sauget should proceed as planned on design and installation of a chemical treatment system. Preliminary design parameters for the recommended unit operations, a preliminary block flow diagram, and a preliminary plot plan are shown in Table 2 and Figures 1 and 2 .

2. The Village of Sauget should obtain from the various wastewater contributors within the Village, details of their plans for reducing those contaminants present in the chemical system effluent which will not be expected to be in compliance with the adopted state effluent criteria. Our recommendations for reductions by individual contributors are shown in Table 3 . Some of the recommended changes have already been planned such as major flow reductions and metals reductions.

3. The Village of Sauget should obtain from the various waste water contributors within the Village, details of any plans for flow reductions or changes in waste characteristics which would increase the severity of expected problems or produce new problems complying with the state effluent criteria. This information must be provided prior to the design of the chemical system.

4. As requested by the Southwestern Illinois Metropolitan Area Planning Commission, the Village of Sauget should continue consideration of joint treatment with the City of East St. Louis if reductions in those contaminants which would be out of compliance in the chemical system effluent cannot be reduced adequately at the sources.

5. The Village should begin compiling the information and fulfilling requirements required for construction grant applications for fiscal year 1974.

RECOMMENDATIONS (continued)

6. If contaminant reduction at the source and/or joint treatment with East St. Louis are not technically or economically feasible, advanced waste treatment techniques such as activated carbon treatment should be reevaluated with practical contaminant reductions.

TABLE 2

RECOMMENDED UNIT OPERATIONS

1. Trash Screens
   Use existing screens - repairs necessary
   Type - Vertical wooden bars
   Number of Screens - 3
   Openings - 2 inches
   Type of Trash - Agglomerated rubber and residue, wood, rags, hoses
   Volume of Trash - 10 cubic feet/day, maximum
   Trash removal - Mechanical, manually activated.
   Trash disposal - Landfill

2. Pumping Station
   Use existing station - modifications and repairs necessary
   Capacity to pump to treatment plant -
   maximum - 11.5 MGD, 8050 gpm, 18 cfs
   [illegible] - 8.75 MGD, 6120 gpm, [illegible] cfs
   Capacity to pump to storage lagoon or storm water clarifier
   maximum - 71 MGD, 49,600 gpm, 110.5 cfs

3. Storm Water Storage Lagoon

Design Capacity:	800,000	gallons Storm
	300,000	gallons Peaks
	1,100,000	gallons Total

Operating (Design): Water Depth = 10 feet
Width = 141 feet) (mean dimensions)
Length = 160 feet)
Freeboard = 3 feet

Embankment Slopes: Interior: 3 horizontal to 1 vertical
Exterior: 3 horizontal to 1 vertical

Embankment Thickness: 8 feet at top, minimum

Embankment Height: 13 feet from bottom of lagoon

Top Interior Dimensions: Length = 178 feet
Width = 159 feet

Bottom Interior Dimensions: Length = 100 feet
Width = 81 feet

Total Basin Volume = 223,000 cubic feet

Liner: Impervious to water

Solids Removal: Front-end-loading bulldozer to landfill

Estimated Yearly Volume Processed: 66,000,000 gallons

Estimated Yearly Solids Retention: 1,330,000 gallons

Frequency of C[illegible]: 4 times/year to maintain 75% operating capacity

Inlet: Baffled

Outlet: Float controlled with flexible arm; "Stop" mechanism to prevent sludge draw-off

4. Storm Water Clarifier

Purpose: To provide primary clarification to storm waters in excess of treatment plant design flow after storage of "First Flush"

Design Overflow Rate: 2000 gal./ft.^{2}-day, maximum

Weir Overflow Rate: 15,000 gal/lin.ft.-day, maximum

Design Flow Rate: 71.5 MGD, maximum

Surface Area (Working): 35,750 square feet

Working Depth: 12 feet

Freeboard: 3 feet

Embankment Slopes: Interior: 3 horizontal to 1 vertical
3 horizontal to 1 vertical

Embankment Thickness: 8 feet at top, minimum

Embankment Height: 15 feet from clarifier bottom

Total Basin Volume: 566,000 cubic feet

Basin Working Volume: 308,000 cubic feet

Liner: Impervious to water ground water relief valves required to prevent damage to liner when drained.)

Scum Removal: Manually tiltable trough with drain to sump pump to central scum handling facility.

Estimated Average Volume
Processed: 40,000,000 gal./year
90,000,000 gal./year

Total Clarifier Working Volume = 2,300,000 gallons
(308,000 cubic feet)

Influent Suspended Solids = 100 mg/l average

Estim. % Solids Removal = 70%

Underflow Suspended Solids = 8%

Vol. Suspended Solids Retention = 40,000 gal/year aver.
90,000 gal/year maximum

Desanding Frequency = One every 72 months (to maintain ~75% or more working capacity)

5. Grit Chamber

Type - rectangular
Number of Chambers - 2
Design Flow - 11.5 MGD
Design Flow Velocity ~1 foot/second
Grit Characteristics
10 - 94% organics
Settling rate 4 feet; minimum
Specific gravity average ~1.5-2.0
Overflow rate 42,800 gallons/day/feet^2
Flow Control - Parshall Flume
Volume of Grit -
Maximum - 520 cubic feet/day
Average - 260 cubic feet/day
Grit Removal - mechanical - continuous
Grit Disposal - landfill
Dimensions - single chamber 56 feet x 5 feet 4 inches
Detention Time
Working - 37 seconds
Total - 56 seconds
Volume - 333 cubic feet, each
Total Area Requirements: 90 feet x 10 feet (including inlet and outlet)

6. Neutralization

A. Chambers
Number required - 2
Shape - cubicle
Detention Time - 10 minutes at design flow (11.5 MGD)
Working Volume - 4,050 feet^3 (30,300 gallons)
Interior Working Dimensions - 16 feet x 16 feet x 16 feet
Approximate Exterior Dimensions - 18.5 feet x 18.5 feet x 18.5 feet
Baffles - baffles to prevent vortexing and influent short circuiting

Agitation - 35 horsepower per chamber, turbine type mixers

Type of Control - feedback pH recorder control - Control valves should have linear trim with positioners

Neutralization - (Chemical Usage, Chemical Storage, Slaking, Feeding)

Waste Acidity - Average 100,500 pounds/day ($CaCO_3$)
Maximum 426,000 pounds/day ($CaCO_3$)

Lime Utilization - At average - 50%
At maximum - 75%

Neutralizing Agent - High Calcium Quicklime

Design Feed Rate Average - 200,000 pounds/day ($CaCO_3$)
- 112,000 pounds/day (CaO)
Maximum - 640,000 pounds/day ($CaCO_3$)
- 410,000 pounds/day (CaO)

Storage Capacity - 7 days based on average usage

Number of Storage Silos - 4

Silo Capacity - 34,000 gallons (each)

Feeder Capacity - Maximum - 90,000 pounds CaO/day (each)
Range - 15,000-90,000 lbs CaO/day

Number of Slakers - 2

Capacity of Slakers - Maximum-180,000 lbs CaO/day (each)
Range-15,000-100,000 lbs CaO/day (each)

7. <u>Flocculation</u>

A. <u>Chamber</u>

Tank Shape - rectangular with rounded fillets along the bottom sidewall.
Sidewall depth - 10 feet

Paddles - four bladed paddles running the width of the chamber with a tip speed of 2 feet/second
detention time 15 minutes

Baffles - baffling between flocculation and sedimentation

Dimensions - 75 feet x 8 feet x 10 feet

B. Polyelectrolyte

Polyelectrolyte - Atlas 2A2
Addition Range - from 0.25 mg/l at 8.75 MGD to 1.5 mg/l at 11.5 MGD or 18.3 lb/day - 144 lb/day
Normal Operation - 0.5 mg/l at 8.75 MGD
Solution Concentration - 0.4% solution

8. Solids and Scum Removal

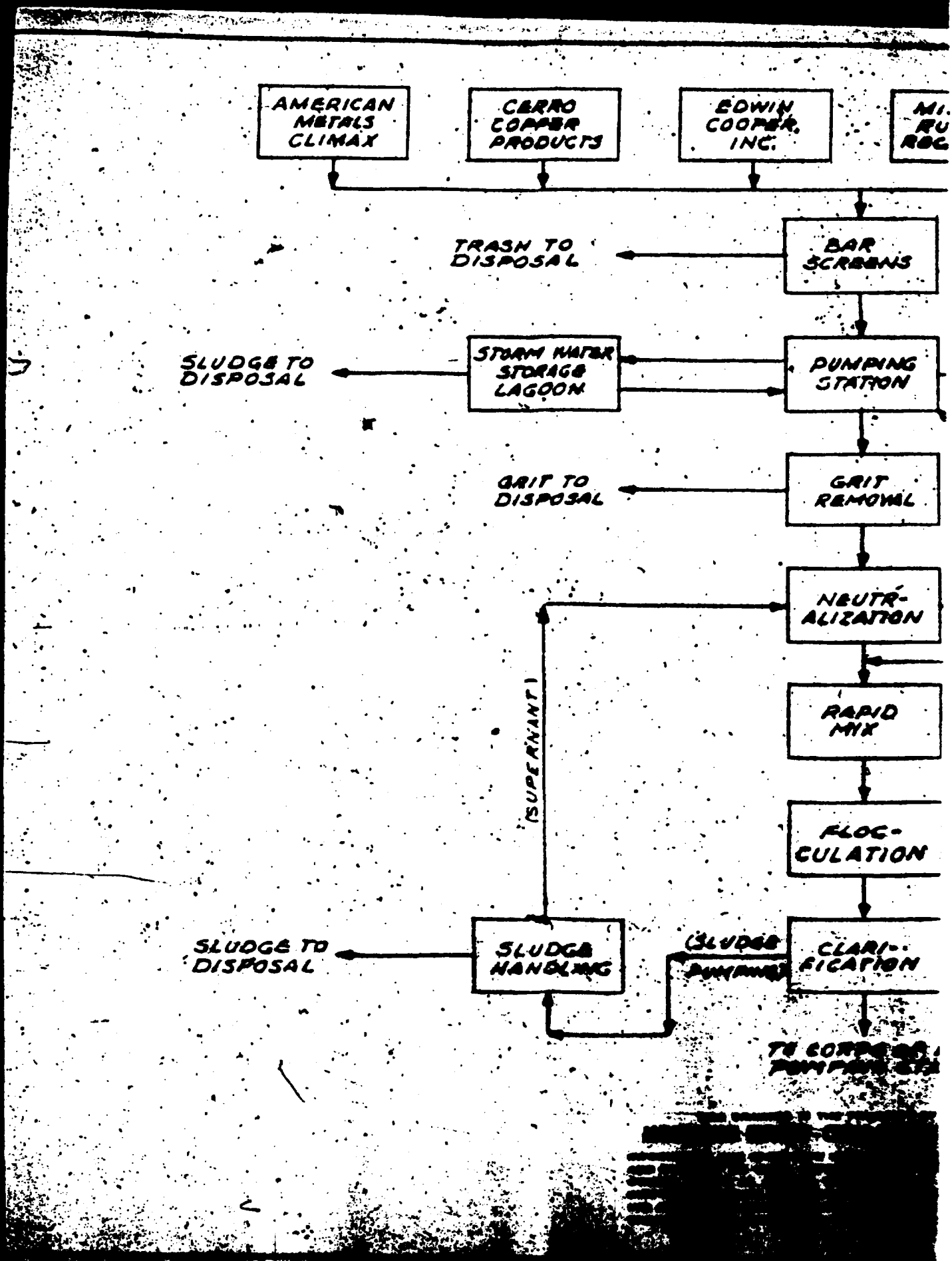
The existing facilities will be used with required repairs or modifications.

9. Sludge Handling & Vacuum Filtration

Sludge Handled - 79,000 lbs/day
Filter Loading Rate - 2.0 lbs/ft^2/day
Period of Operation - 24 hours/day
Total Filter Area - 1250 square feet
Space Required - 56 feet x 49 feet for two filters
- 56 feet x 24 feet for future expansion
Ultimate Disposal - Landfill

10. Flow Measurement and Sampling

Flow measurement - Parshall Flume
Sampling - Continuous, flow proportioned sample for -
1. Raw waste before neutralization
2. Effluent from clarifiers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CERRO COPPER PRODUCTS
EDWIN COOPER, INC.
TRASH TO DISPOSAL
BAR SCREENS
SLUDGE TO DISPOSAL
STORM WATER STORAGE LAGOON
PUMPING STATION
GRIT TO DISPOSAL
GRIT REMOVAL
NEUTRALIZATION
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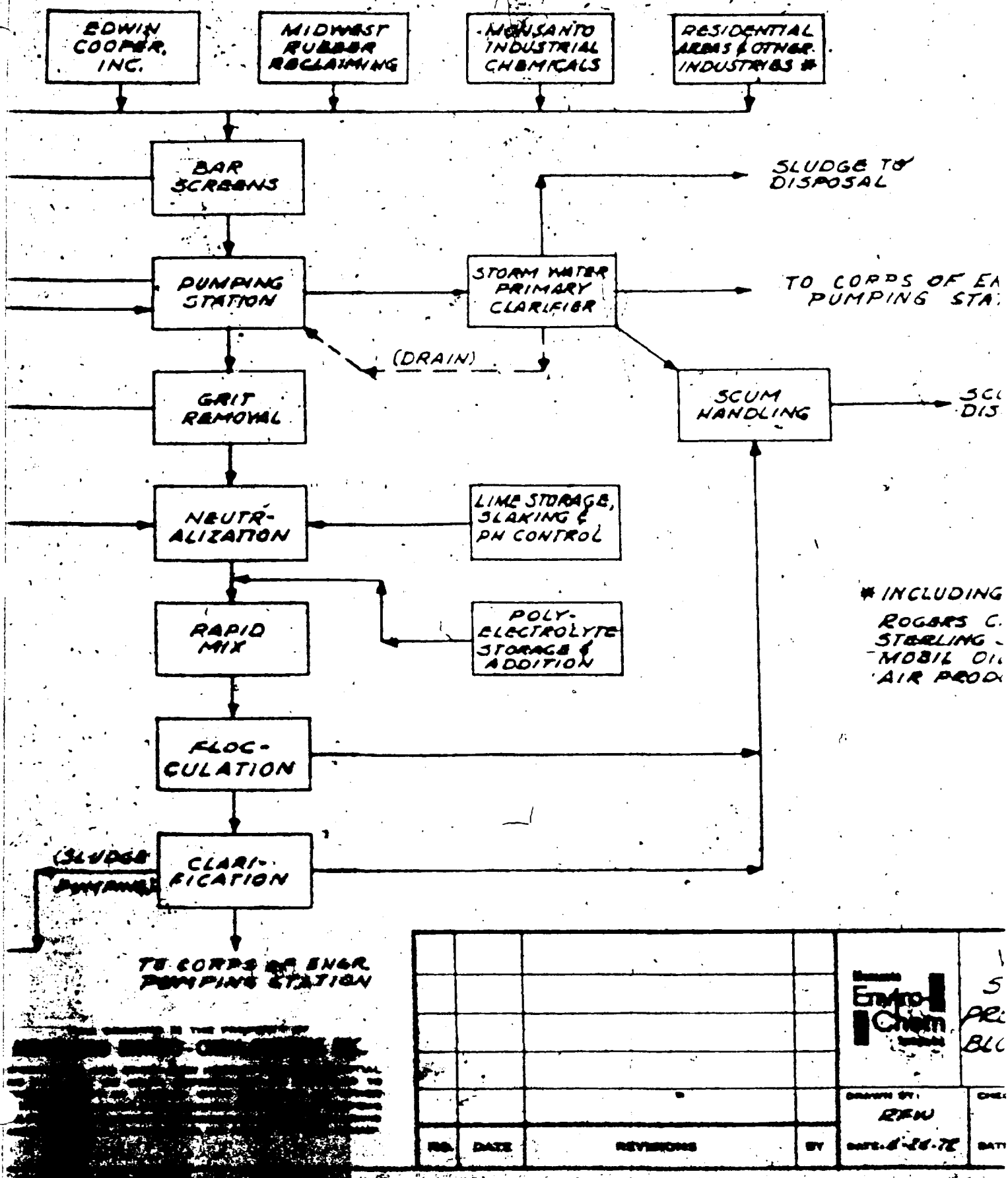
SLUDGE TO DISPOSAL
SLUDGE HANDLING
(SLUDGE
CLARIFICATION


EDWIN COOPER, INC.
MIDWEST RUBBER RECLAIMING
MONSANTO INDUSTRIAL CHEMICALS
RESIDENTIAL AREAS & OTHER INDUSTRIES *
BAR SCREENS
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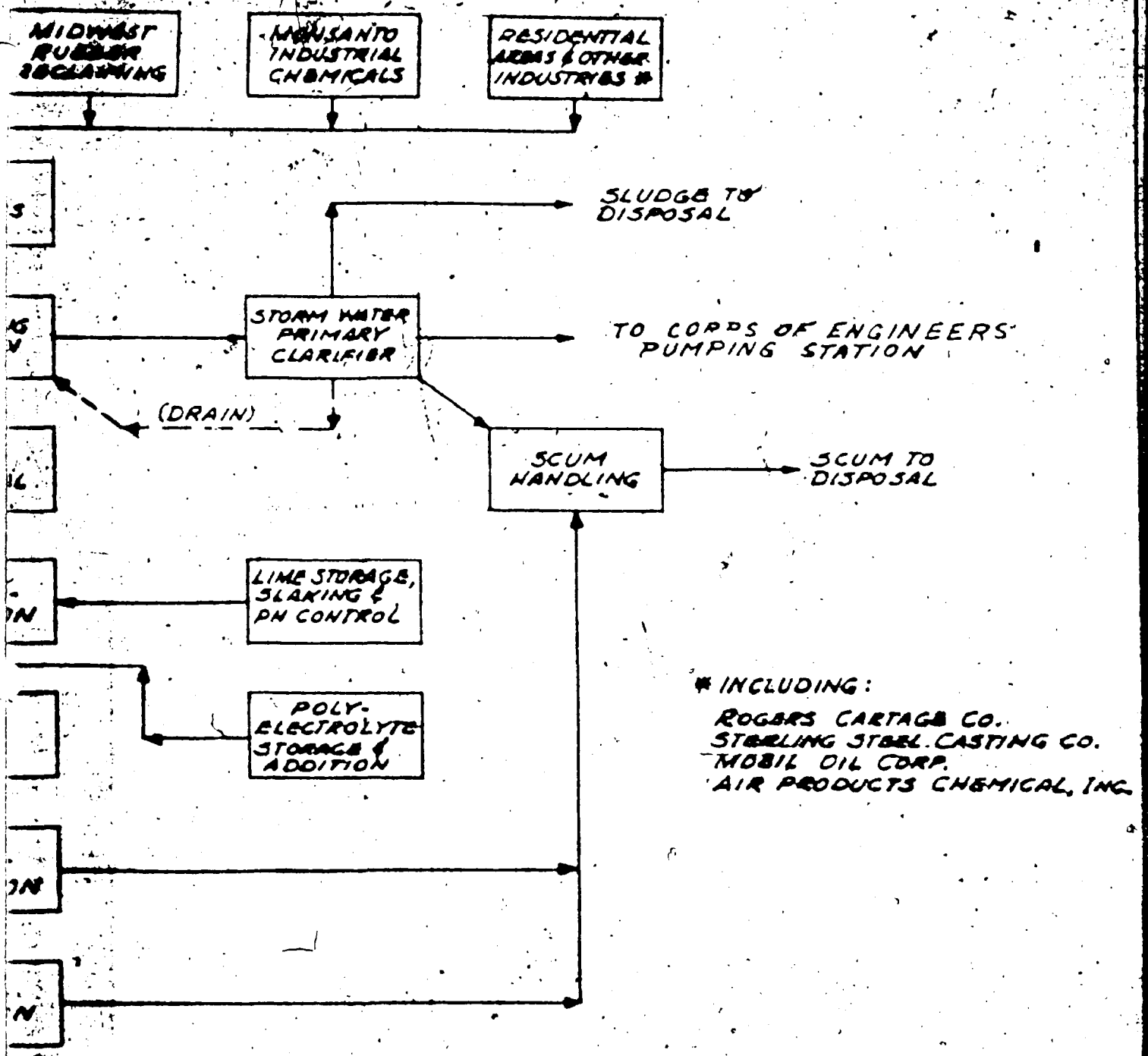

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Envirotech Chem

VILLAGE OF SAUGET, ILLINOIS
PRELIMINARY PROCESS BLOCK FLOW DIAGRAM

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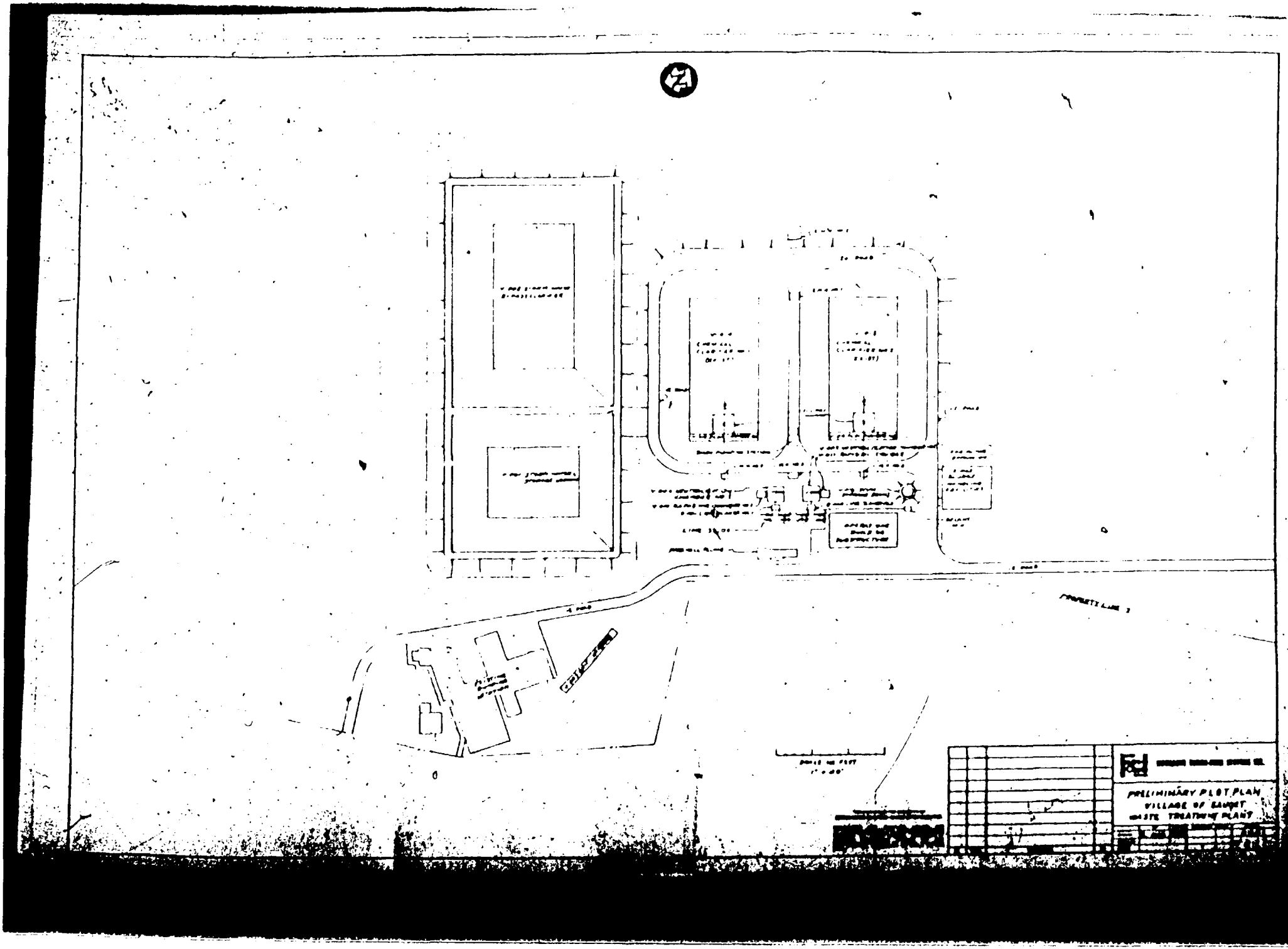
PROPERTY LINE
PRELIMINARY PLOT PLAN
VILLAGE OF BANGOR
WASTE TREATMENT PLANT

TABLE 3

Recommended Waste Reductions within the Village of Sauget, Illinois

Contributor	Item
American Zinc or American Metals Climax	Flow Metals losses
Edwin Cooper	Flow Floating Oil & Scum BOD_5 especially low molecular weight organics Odor causing wastes Color Bodies
Cerro Copper	Metals losses
Midwest Rubber Reclaiming	Flow BOD_5 Rubber Odor Causing Wastes Color Bodies
Monsanto Industries Chemicals Co.	Flow Color Bodies Phenols & other Aromatics BOD_5 Odor Causing Wastes Chlorine Dumps

Dissolved Solids - Each industry should evaluate costs for reducing dissolved solids discharges. At this time the technology available for removal of dissolved solids from the Village effluent is unproven on this scale and costs are extremely high and uncertain.