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State of New Jersey
Department of Environmental Protection

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Proceedings
Seminar on Industrial Pretreatment
Federal, State and Local Government Perspectives
and Industry's Interests

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Let's protect our earth



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Editor's Foreward

Several of the speakers who made their way to New Jersey Institute of Technology in Newark on a very snowy February 21, 1979 and Donald Ereth, who was hopelessly marooned in Washington, D.C. by that record snowfall, have contributed papers to these Proceedings. I am very grateful to them all. I express my apologies to the authors and the subscribers, for the considerable amount of time that has elapsed in the preparation of this document for publication.

Former NJDEP Commissioner O'Hern's opening statement sets the tone of the Seminar by calling for sustained cooperative effort to implement pretreatment on the part of federal, state and local agencies, industry and the concerned citizen. The former Commissioner emphasizes the joint responsibility of these groups for protecting our collective environment and health. John Frisco of EPA Region II discusses the need for industrial pretreatment and the federal strategy for the nationwide implementation of the program. Donald Brown, then with NJDEP, presents a number of legal options available to New Jersey in taking a lead role in the Pretreatment Program, despite the fact that it is not, at present, a NPDES state. Mr. Brown also summarizes a work plan prepared by the Office of Sludge Management and Industrial Pretreatment (OSMIP) for a statewide industrial pretreatment strategy. Dr. Marwan M. Sadat, Program Director of OSMIP, examines the prohibitions imposed by the federal General Pretreatment Regulations, limits and prohibitions in existing municipal sewer use ordinances, and the elements of proposed pretreatment regulations for New Jersey. Kenneth Goldstein, of the OSMIP staff, details the contents and use of the State's "Guidelines for the Preparation of Industrial Waste Surveys." Donald Ereth's joint paper with Michael Callahan, both from EPA Headquarters, describes a pilot project on source monitoring in a municipal system. The study considers the feasibility of determining specific source contributions, evaluates the reliability of sampling and analysis techniques, and provides priority pollutant data on a specific POTW. Dr. Ronald Buchanan, NJDEP, discusses current and future work by the Solid Waste Administration on the management of hazardous waste in New Jersey, which will include pretreatment sludges in the future. Donald Menno of the Buffalo Sewer Authority, New York, presents an overview of the development and implementation of a local pretreatment program by that authority. Mr. Menno details everything from the industrial waste survey, to the required ordinance, to the actual permit application and sample permit form.

I think that the papers which were contributed constitute a fairly balanced picture of industrial pretreatment from government and local perspectives. I do regret that some of our speakers, particularly those who spoke on industrial concerns, were unable to prepare their work for these Proceedings. I must also remind the reader that industrial pretreatment is a program that continues to evolve at a rapid pace, so that some of the material in these Proceedings may already be obsolete.

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Opening Address

Daniel J. O'Hern, Commissioner
New Jersey Department of
Environmental Protection

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The federal Clean Water Act has set the elimination of toxic discharges as a national goal and policy, and it is clear that the main thrust of federal and State environmental programs over the next decade will be to develop the mechanisms needed to control the introduction of toxic and hazardous substances into our streams and aquifers.

Since 1972 the main emphasis of federal and State water pollution control efforts has been the resolution of the more conventional water pollution problems, and much has been said about the successes and shortcomings of the Construction Grants Program. However, there can be little doubt that the program has achieved a dramatic reduction of biological oxygen demand (BOD) from municipal discharges. This has been achieved with the expenditure of some \$23 billion of federal funds. Although this reduction is important in protecting both public health and the aquatic ecosystem, water pollution control programs have neglected to deal with the toxics problem.

The discharge of toxic substances into our waters is not just an abstract water quality issue. It is an issue of vital concern in the protection of the health and well being of our citizens. The presence of carcinogens in the public water supplies of several major United States cities is well documented, and it is clear that there is a need--indeed an urgent need--to eliminate these chemicals from the waters of the State. The need to reduce, and in some cases to completely eliminate, the discharge of toxics to the waters of New Jersey is especially critical here, where our available water resources are intensively utilized and reutilized.

Our efforts to deal with the conventional pollutants have been successful. I believe that now we must redirect and redouble those efforts if we are to resolve the complex problem of toxics in the environment. This will not be achieved overnight. The pretreatment of industrial wastes before their discharge into municipal sewer systems will be the dominating issue of the 1980's, and will require the full attention and cooperation of federal, State and municipal officials, as well as industry itself.

We will have to deal with many complex problems intrinsic to the toxics situation, as we progress toward the control of these chemicals. Among these is the question of handling the residue from the pretreatment of industrial discharges to municipal sewage treatment plants. Some of these materials may be recycled. Nevertheless, it is clear that we must, on a national level, develop environmentally acceptable means of disposing of these industrial pretreatment sludges.

The pretreatment program is by far the most challenging that water pollution control agencies will undertake over the next decade. I believe that success will depend on the ability of federal, State and local agencies, in cooperation with the private sector and concerned citizens, to develop imaginative, innovative approaches to this complex issue. It will be important for all of us to be involved in and committed to this endeavor. Traditionally, the public and the private sectors have perceived each other as adversaries. Moreover, sewerage authorities, municipalities and local water pollution control agencies have, in most instances, retreated into a passive role and allowed State and federal agencies to assume responsibilities for local as well as regional environmental planning. Many of these local agencies, which were pioneers in developing regional solutions to water pollution control problems, have now accepted a secondary role in planning for the environment. If we are to be successful, this situation must change.

There is a striking similarity between the early efforts around the turn of the century for the collection of domestic wastes and their treatment at centralized treatment plants, and the problem which now faces most of the of industries which will be required to pretreat. I believe that a similar approach to this problem may have merit.

It can be argued that, in our haste to deal with the conventional pollutants, we may have overlooked potential solutions to problems in treating industrial wastes. Now is the time to look carefully at the parallels in municipal and industrial wastewater treatment.

Many industrial discharges contain materials which can be removed by a common process. An industrial waste treatment plant which combines two or three removal processes could, technically, service a large number of industries. Economy of scale is always a factor in the impact of requirements involving construction, operation, and maintenance of wastewater treatment facilities.

The trend toward regionalization of municipal wastewater treatment has resulted or will result in abandonment of numerous small treatment plants throughout the country. There is an opportunity here to recover and recycle these obsolete municipal treatment plants. The conversion of abandoned plants for the pretreatment of industrial wastes could be a truly cost-effective solution to the problem of the indirect discharge of toxics to our waters.

It may also be productive to consider the installation of industrial waste collection systems in existing municipal sewers. The New Jersey Department of Environmental Protection has been investigating various technologies which could be used for such a purpose. For example, it is technologically feasible that small diameter plastic pipes operating at low pressure could be installed within existing municipal sewer trunks and interceptors. This parallel industrial waste collection system could then convey these wastes to centralized pretreatment facilities which would be operated by the sewerage authorities. This technology is presently available. Purveyors of natural gas have, over the last decade, retrofitted many of their older cast iron and steel conduits by threading modern plastic pipes into the existing gas distribution systems.

I believe that this can and should be done. I also feel that the logical people to take the lead in converting and operating such plants are today's wastewater treatment technologists. I think that municipally-operated industrial pretreatment plants make a great deal of sense both technically and economically. Industrial cost recovery for operation and maintenance, even construction costs for converting old municipal plants, seems like a reasonable and practical way for industry to fulfill its responsibility in the prevention of contamination of our waters with its toxic wastes.

I feel that we must all accept responsibility here because it is our environment and our health which is at stake. I believe that cooperation and the willingness to consider innovative uses of past solutions, as well as entirely new approaches, can mean the successful resolution of a difficult, complicated situation. That success would benefit all of us, today and tomorrow.

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The Federal Industrial Pretreatment Program

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Discharges of industrial waste into publicly owned treatment works (POTW's) can be a significant source of environmental damage and a danger to public health. Studies done by EPA estimate that industrial discharges may account for as much as 25% of the total flow to POTW's in this country and that up to 1/3 of this industrial flow contains pollutants that are hazardous to human health and the environment.

Industrial pollutants discharged to POTW's can cause problems in three major areas:

FIRST - - They can interfere with the POTW's normal operation - - by upsetting the biological treatment process, damaging plant equipment and sewers, and in extreme cases, endangering plant employees;

SECOND - - They can contaminate the POTW's sludge and make it unfit for such beneficial uses as application to crop land, since hazardous materials may leach out of the sludge and into groundwater, or be taken up into crops; and

THIRD - - Many industrial pollutants are not susceptible to treatment in the POTW and can pass right through the plant into the environment in quantities which would be unacceptable if discharged by a direct discharger.

Pollutants which cause or have the potential to cause any of these three types of problems are said to be INCOMPATIBLE with a POTW and require some sort of PRETREATMENT by the industry prior to discharge to the POTW sewer system. While a number of local governments already have rules or ordinances to protect POTW's from interference or damage, very few have programs to prevent the "pass-through" of untreated pollutants into waterways or their accumulation in the POTW's sludge.

Given the concern over these problems, EPA attempted to develop a national pretreatment strategy to regulate indirect dischargers and also to establish who would be responsible for enforcing those regulations. Because of the potential impact of such a strategy, the Agency made a major effort to encourage public involvement during its development.

In February of 1977, EPA proposed four pretreatment strategy options for public consideration and comment. Four public hearings and a number of public meetings were held on the four proposals, and over 375 sets of written comments were received.

In addition to the public's input, there was major congressional consideration of pretreatment in the 1977 amendments to the Water Pollution Control Act, or

the Clean Water Act as it is now known. To a large degree, the new Act decided the Agency's course, since it specifies the minimum number of pollutants to be regulated, provides for local adjustments of national standards to compensate for POTW removals, and places the major responsibility for enforcement on local governments.

On June 26 of last year, EPA published the final pretreatment regulations. They establish two types of pretreatment standards.

The first prohibits the discharge of pollutants which will interfere with normal POTW operations. These prohibitions already appear in most sewer use ordinances and include: materials which create fire or explosion hazards; solids or viscous materials; strong acids or bases, etc. This interference prohibition implies that a POTW has the authority to impose numerical limits on heavy metals or other substances to which its process is sensitive. The second type, the categorical standard, is designed primarily to control the discharge of pollutants which will pass through the POTW or contaminate its sludge.

Categorical pretreatment standards will be established for 65 toxic pollutants which may currently be discharged by 21 industrial categories. The standard will be set on an industry-by-industry basis. The 21 industries and 65 pollutants are listed in the June 26, 1978 Federal Register. They were selected jointly by EPA and the Natural Resources Defense Council as those having the greatest potential for environmental impact.

In almost all cases, EPA will not regulate incompatible pollutants which are not generally present in toxic amounts in a particular industrial category, but will instead issue guidance to State and local governments on how best to control such pollutants when necessary.

Where national pretreatment standards are set for a specific pollutant, discharge limits will reflect the application of best available treatment (BAT). It should be noted that discharge limits based on BAT may not be the same for direct and indirect dischargers in the same industrial category since the factors that determine BAT may differ. In its investigation of any such industrial category, EPA considers the range in plant ages, sizes, amounts of land available for treatment, etc.

Pretreatment standards will express discharge limits in easier-to-enforce concentration limits and, where possible, will provide an equivalent mass limit which may be used by the enforcement authority if it desires.

Compliance dates for pretreatment standards for existing sources will normally be three years after promulgation. Immediate compliance will be required for new sources.

EPA will initially encourage POTW's to enforce national pretreatment standards, and POTW's receiving new construction grants will be required to develop enforcement programs as a condition of their grants. The costs of developing local pretreatment programs are eligible for 75% federal funding.

POTW's with flows over 5 MGD, which receive industrial waste, will be required to have a pretreatment program in effect within 3 years of the next NPDES permit reissuance or modification, but in no event later than 1983. In addition, EPA or an NPDES State may require POTW's with flows less than 5 MGD, and receiving industrial waste, to develop pretreatment programs when so designated by EPA or the NPDES State.

There will be a three-tiered approach to enforcing pretreatment standards with primary responsibility at the local level followed by the states and lastly by EPA.

Where POTW's are not required to develop local programs, EPA will enforce pretreatment standards directly against industrial violators. Where a local program is required but not developed, enforcement actions will be taken against both the POTW and the industry.

In order to prevent industry from having to install unnecessary treatment for controlled pollutants, the regulation provides for modification of the national standards to reflect the capability of the POTW to remove these pollutants.

To obtain such a modification or credit, the POTW must develop an approved local pretreatment program. In addition, the POTW must demonstrate that it consistently removes the pollutant at the level claimed, consistent being defined as 95% of the samples. And finally, that the modification of the standards will not create problems for disposal of the sludge.

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NJDEP'S Pretreatment Program

Donald A. Brown, Director
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This paper will examine those regulatory options available to the State for implementing the Federal Pretreatment Program and will discuss NJDEP's statewide industrial pretreatment strategy.

In 1972 the New Jersey Legislature passed the New Jersey Pretreatment Act. This statute (N.J.S.A. 58:11-49) gives NJDEP broad authority to establish rules relating to pretreatment. Broad powers are also given to authorities, commissions, and any public bodies or agencies which own, operate, or control any public sewage treatment plant. In addition, in 1976, the Legislature enacted the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1). This law provides some additional powers to NJDEP and local governments and authorities.

These two statutes give NJDEP considerable flexibility in creating a pretreatment program. We believe that these two statutes constitute sufficient legal basis for implementing the program which is now required by federal law.

As you have heard this morning, EPA regulations promulgated on June 26, 1978 assign the responsibility for developing pretreatment programs, using federal monies, to municipalities and sewerage authorities administering one or more publically owned treatment works (POTW) of which the total design capacity exceeds 5 million gallons per day (5 MGD). For smaller POTW's, EPA, the NPDES State or the POTW may develop an industrial pretreatment program. The enforcement strategy which EPA has promulgated along with these regulations is also structured to rely primarily on local authorities whose flow is greater than 5 MGD, with NPDES States and/or EPA in the oversight role, taking enforcement action directly against the POTW and/or the industry where necessary. The NPDES States or EPA retain development and primary enforcement responsibilities for those systems where design flow is less than 5 MGD, except where designated to develop their own programs by EPA or the NPDES State.

In New Jersey there are 32 systems which will definitely be required to develop and enforce their own pretreatment programs. This leaves 560 treatment systems, more or less, as part of the EPA or NPDES State responsibility. At the same time, approximately 310 of these treatment plants have flows of less than 100,000 gallons/day, and probably have no industrial contribution.

You will notice that under the federal scheme only EPA and NPDES States have specific responsibility for development of a pretreatment program. However, due to the inordinately large number of industries which discharge into municipal systems in New Jersey, and because of the concomitant problems created by the lack of a pretreatment program, EPA and NJDEP are very interested in assuring that DEP plays a major role in the federal program. We are now considering a number of legal options which would allow NJDEP to take the lead role under the federal regulations. These options include:

- (1) Assume a partial delegation of the NPDES Program (NJDEP would be delegated only that part of the NPDES Program which applies to pretreatment);
- (2) Require pretreatment programs for 401 certifications of NPDES permits, and/or
- (3) Implement State pretreatment programs through 201 project certification requirements.

In any event, NJDEP is planning to play a major role in the development and implementation of a pretreatment program.

Pretreatment in New Jersey is an issue of serious concern, because of the inordinately large number of industrial inputs to municipal systems. We at DEP do not know which or how many industrial dischargers will be affected by a pretreatment program, since a complete listing of the industrial dischargers using the State's municipal systems has yet to be compiled. (The development of such a survey is one of the highest priorities in the proposed statewide industrial pretreatment strategy which I will discuss shortly.) As a result of these uncertainties, the estimated number of industries to be eventually affected by the State's pretreatment program varies from 8,000 to 30,000. No matter what the figure, the number will be significant; New Jersey's pretreatment program is certain to affect a large percentage of its industry.

Due to the large number of industries affected, and because of the paramount need to remove those toxic substances which are being discharged into the State's waters in the absence of a pretreatment program, NJDEP's Office of Sludge Management and Industrial Pretreatment and the Office of Regulatory Affairs have developed a comprehensive strategy for implementing pretreatment.

The OSMIP has prepared a work plan for a statewide industrial pretreatment strategy. The strategy is divided into three phases: (1) expansion of the Wastewater Management Information System (WMIS) to accommodate industrial pretreatment data, (2) development of the statewide industrial pretreatment plan, and (3) implementation of industrial pretreatment programs and statewide monitoring. The elements in each phase are addressed in some detail in the following sections.

1. Expansion of the WMIS - An extensive data base is needed in order to develop an effective pretreatment plan for New Jersey. The WMIS will be expanded to incorporate information from the following sources for this purpose: (A) Sludge Quality Assurance Regulations, (B) Indirect Discharges Survey Regulations and C) industrial waste surveys.

The Sludge Quality Assurance Regulations are to be proposed in the very near future. These regulations will provide data on the degree of industrial contamination in the sludges of particular municipal systems. Using other data available in the WMIS, and various calculations, industrial contamination of influent and effluent for these systems can be estimated. The Sludge Quality Assurance Regulations will be promulgated during 1979, under the New Jersey Pretreatment Act of 1972 and the New Jersey Water Pollution Control Act of 1977.

The Indirect Discharges Survey Regulations will require general information concerning all industrial inputs into municipal sewer systems. Tributary sewer systems will also have to indicate into which regional system they discharge. Promulgation will be under the New Jersey Pretreatment Act of 1972, and will apply to all municipalities and sewerage authorities. The information requested will include the following:

- (A) Name and address of the industry,
- (B) Average flow, and
- (C) Industrial classification index (SIC. No.).

It is expected that these regulations will also be adopted during 1979.

Industrial waste surveys will provide extensive and specific information on industrial inputs into municipal systems. These surveys are currently a mandatory element in the development of local pretreatment programs by treatment systems having flows above 5 MGD, as required by the June 26, 1978 federal regulations discussed above. These surveys are eligible for 201 construction grant funds.

As a designated 208 industrial pretreatment management agency, NJDEP may require pretreatment programs for additional POTW's with a flow of less than 5.0 MGD. Construction grant funds would be made available in such cases.

2. Development of the Statewide Industrial Pretreatment Plan - With the integration of the data provided by the three sources described above, the WMIS will be used to establish priorities among pretreatment projects throughout the State. This will insure the most efficient use of available funds and manpower, in terms of documented environmental needs. The systems with the highest priority ratings will be the first to receive aid in developing pretreatment programs.

Comprehensive guidelines will be issued to assist municipalities and authorities in establishing and executing local pretreatment programs, using 201 grants. These guidelines will provide the technical framework to consulting engineers and municipalities, in performing: (A) industrial waste surveys, (B) pretreatment ordinance development and adoption; (C) monitoring and enforcement of federal, State, and local pretreatment requirements, and (D) other related tasks. The first two elements of these guidelines are presently being developed by the OSMIP.

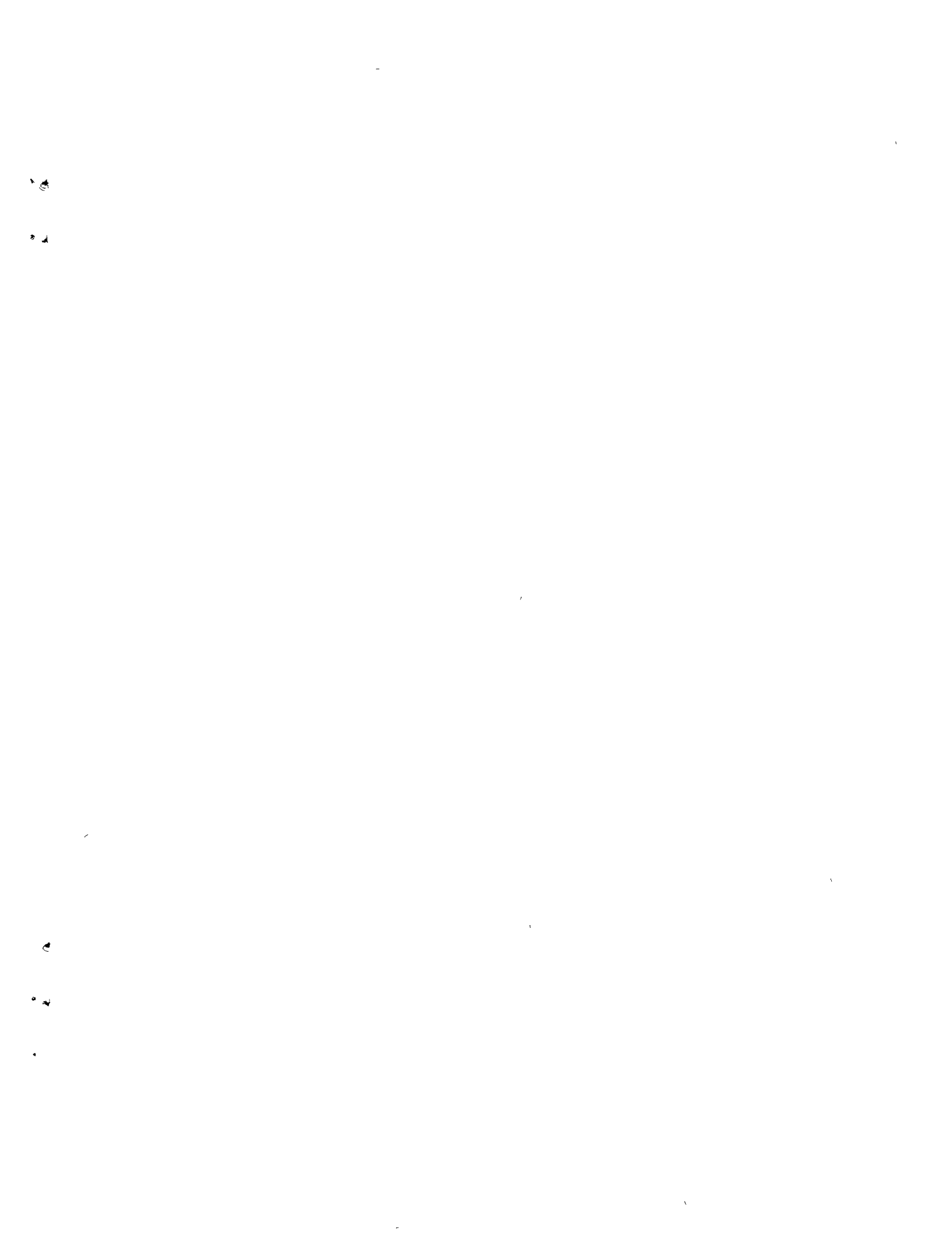
3. Implementation of Industrial Pretreatment Programs and Statewide Monitoring - Implementation of pretreatment on a statewide basis, and the assurance of its long-term effectiveness will require various forms of regulatory support. General Pretreatment Regulations and regulations for local pretreatment programs, will be proposed in this regard.

The General Pretreatment Regulations are currently being developed by DEP. These regulations would incorporate the general restrictions included in Section 403 of the June 26, 1978 federal regulations. Additional or more stringent restrictions will be included, if warranted by the information being gathered concerning New Jersey's particular needs. It is anticipated that these regulations will be promulgated during 1979.

Regulations for local pretreatment programs will consist of several specific requirements. Authorities and municipalities operating POTW's will be required to adopt industrial pretreatment ordinances no less stringent than the State's model pretreatment ordinance. In addition, municipal sewer systems which contribute to regional POTW's will be required to obtain industrial pretreatment ordinance permits from the receiving POTW's,

and also to adopt industrial pretreatment ordinances no less stringent than the State's model ordinance. These regulations will require, in addition, that POTW's report to DEP on a regular basis on the concentrations of incompatible and toxic pollutants in their systems. Finally, these regulations would describe the enforcement and monitoring procedures to be performed by the State and local agencies.

It shall be noted that existing federal legislation, the Clean Water Act of 1977, already makes it mandatory for municipalities to adopt industrial pretreatment ordinances as a condition of any NPDES permit. The regulations, as described, will require that municipal sewer systems which depend on larger systems for treatment of their wastewater, obtain permits from the receiving POTW's. This will legally bind such municipalities to control the quality of their effluents into regional systems. Developing their own pretreatment ordinances will provide these contributing systems with the legal means to control their industrial inputs.



Proposed New Jersey
General Pretreatment Regulations

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The June 25, 1978 Federal Register contained final rules entitled "General Pretreatment Regulations for Existing and New Sources of Pollution", Part 403. Section 403.5 of these regulations concern general prohibitions on discharges to publicly owned treatment works (POTW's), which became effective on August 25, 1978.

Among these prohibitions are the following:

- a) pollutants which create a fire or explosion hazard;
- b) pollutants which cause corrosive damage, but in no case any discharge having a pH lower than 5.0 unless the works is specially designed;
- c) solids or viscous pollutants in amounts which will interfere with POTW operation, whether by obstruction or otherwise;
- d) pollutants, including oxygen demanding pollutants (BOD, COD, etc.) of such strength or volume as to cause interference with POTW operation;
- e) heat which will cause interference, but in no case in amounts such that the temperature at the treatment works exceeds 40°C (104°F), unless the works is specially designed.

Also included in this section is an overall prohibition on pollutants from any nondomestic source which inhibit or interfere with the operation or performance of the works.

Interference, as used in these regulations, means any inhibition or disruption of a POTW sewer system, treatment process, or operation which contributes to a violation of any requirement of its NPDES permit. These prohibitions apply to all industrial users, regardless of size or Standard Industrial Classification (SIC).

My staff has gathered some data on existing sewer use ordinances, most of which were developed to fulfill 201 Construction Grants requirements. These ordinances contain some general restrictions on nondomestic discharges to the treatment plants. Some of the ordinances include numerical limits on certain parameters, such as BOD.

Table 1 summarizes the data on the inclusion and range of restrictions on BOD, for POTW's having flows of 1.0 million gallons per day (MGD) or greater. Well over a third of the ordinances contain no specific BOD limits. More than half of the BOD limits found range from 100-400 parts per million. There were a few limits above the range, and a few ordinances that simply referred to the POTW's own NPDES limits for this purpose. A glance at Table 2 reveals that 31-50% of the POTW's in the various size categories do not have numerical limits on BOD.

There are a number of treatment plants, in New Jersey today, receiving industrial inputs containing high concentrations of oxygen-demanding pollutants. Most of these plants experience frequent upsets, and operate below peak efficiency as a regular "state of affairs." In some cases, attempts have been made to force industry to reduce the levels of these pollutants in their discharge. These attempts have been largely unsuccessful. At least part of the difficulty has been demonstrating, to the satisfaction of the courts, that the input of a particular industry is responsible for upsets to the treatment process. The "burden of proof" under these circumstances is, indeed, a burden.

Violations of well-documented quantitative restrictions are much easier to demonstrate than infringements on qualitative prohibitions. I believe that all POTW's which are required to develop pretreatment programs should have carefully developed and documented numerical restrictions on BOD, as well as the other oxygen demanding pollutants, suspended solids, and pH.

I feel that this is the only way that a clear understanding between a municipal authority and its industrial users can be established, and a reasonable case presented if violations occur.

Later this year, the Department will propose some general regulations concerning pretreatment. They will, in part, reiterate Section 403.5 of the federal regulations. In addition, they will require that all existing numerical limits associated with local ordinances be met. However, the maximum acceptable ordinance limits on BOD and other oxygen demanding pollutants will be set by some reasonable formula such as 1.5 times the design values for the particular POTW. There will be some provision for variance requests from POTW's on this issue. The granting of a variance will require the development of an acceptable waste load allocation plan as an alternative method of protecting the treatment operation and receiving waters.

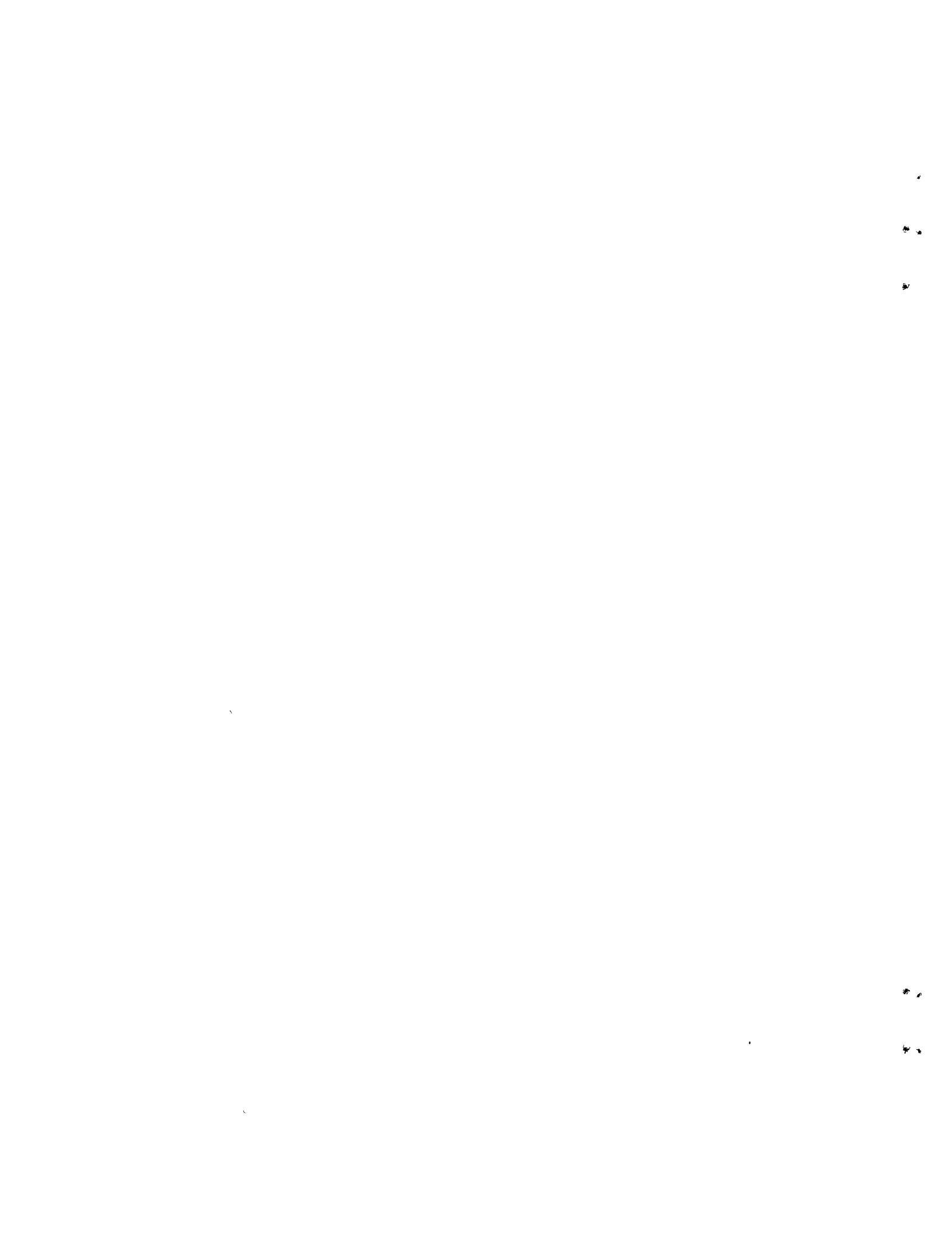
Additional sections concerning the priority pollutants and other issues are being considered for inclusion in these proposed regulations. This will be the first regulatory step in tailoring the industrial pretreatment program to New Jersey's unique needs.

TABLE 1
 ORDINANCE-IMPOSED BOD LIMITS
 FOR POTW's 1.0 MGD AND LARGER

No. of Plants	BOD Limits (MG/L)	% of Plants
41	NONE	36
8	Same as NPDES	7
14	100-200	13
18	200-300	16
27	300-400	24
4	>400	4
Total 71	With limits	63%

TABLE 2
 CLASSIFICATION OF ORDINANCES
 BY POTW SIZE

FLOW (MGD)	NO. WITH BOD LIMITS	NO. W/OUT BOD LIMITS	%WITH BOD LIMITS
1-2	27	12	69
2-3	9	7	56
3-4	6	6	50
4-5	7	4	64
5	22	10	69



New Jersey's
Guidelines for the Preparation of Industrial Waste Surveys

Kenneth Goldstein, Environmental Engineer
Office of Sludge Management and
Industrial Pretreatment
New Jersey Department of
Environmental Protection

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It is the Department of Environmental Protection's position that the introduction of toxic pollutants into a municipal or regional sewerage system represents an environmental hazard and should be minimized.

Toxic pollutants that enter publicly-owned treatment works (POTW's), as part of the influent wastewater, tend to accumulate in the sludge and contaminate it. The disposal or utilization of contaminated sludge may introduce the toxic pollutants back into the environment. Contamination of the sludge would reduce its usefulness as a recoverable resource, and the sludge would become an environmental liability. An obvious solution to this problem is to prevent these contaminants from entering the sludge. Thus, the removal and/or reduction of toxic pollutants in a POTW's influent wastewater is essential.

The identification of the sources of industrial pollutants (both toxic and inhibitory), and the determination of the nature and quantities of these substances, are necessary and important steps in the development of an industrial pretreatment program. Therefore, the Environmental Protection Agency, under the authority of Section 201 of the Clean Water Act of 1977 and Part 403 of the Federal Regulations, is requiring POTW'S over 5 MGD to prepare Industrial Waste Surveys as the initial step of an effective Industrial Pretreatment Program.

The Office of Sludge Management and Industrial Pretreatment is preparing Guidelines for the Preparation of Industrial Waste Surveys in order to aid the affected authorities by providing a methodology for the preparation of these surveys. These Guidelines should be in final form by summer, 1979.

The objective of an Industrial Waste Survey is to identify the quantities and sources of selected compatible, incompatible and inhibitory pollutants entering the POTW. Knowledge of the sources of the pollutants, whether they are industrial, residential or commercial, will permit determination of the amount of each constituent that can be removed by pretreatment. An effective Industrial Pretreatment Program will accomplish the following:

1. Improve and/or protect plant efficiency from the effects of inhibitory pollutants entering the POTW;
2. Reduce and/or eliminate the concentrations of various toxic pollutants in the POTW effluent;

3. Improve the sludge quality and hence facilitate its disposal and/or utilization; and
4. Develop an effective monitoring program to prevent and/or deter the future discharge of slug loads of toxic pollutants.

In order to permit the regulatory agencies to monitor the progress of the Industrial Waste Survey, three submissions must be made.

1. Plan of Study

The Plan of Study should be submitted for approval before any work is begun. The work to be performed during Phase I of the survey is to be described in the Plan. The major objectives of Phase I are to:

1. Identify the industries to be sampled;
2. Perform a preliminary mass balance on the system;
3. Establish the residential or baseline contribution; and
4. Outline an adequate quality assurance program for the sampling.

2. Plan of Attack

The Plan of Attack should be submitted with the preliminary results from Phase I. This Plan describes the work to be performed in Phase II, which is basically a list of the industries to be sampled and the type of sampling to be used for each industry.

3. Final Report

The final report is to be submitted upon the completion of the survey. The report should contain, as a minimum, the following elements:

1. The results of the sampling and analysis programs;
2. Mass balances relating the pollutant sources with the pollutant input to the POTW;
3. The results of the quality assurance program; and
4. Estimation of the level of pollutant reduction achievable in the plant effluent through pretreatment of industrial sources and the resultant reduction of input loading to the plant.

The first step of Phase I is to identify those industries which discharge into the collection system. There are many records and published lists from which a complete list can be created. These include the POTW's own files, municipal tax records, water use records, Department of Labor and Industry files, and the Yellow Pages. In addition, the Office of Sludge Management and Industrial Pretreatment has a printout of those industries which have an Air Pollution Permit. Since this includes nearly all the industries in New Jersey, you may wish to check your list against ours.

Once the industries are identified, a questionnaire designed to gather some necessary information directly from the sources should be sent to each of these industries. A few of the items to be required are listed below.

1. Name, address, phone number of company and respondent
2. Type of industry (SIC#)
3. Water usage
4. Description of discharge
5. Number and location of discharge points

There are other bits of data you may wish to have, but these are the most important.

It will probably be necessary to follow up this questionnaire with phone calls and/or plant interviews in order to insure complete response. Plant inspections would also be advisable in order to validate the last piece of information -- the number and location of discharge points.

From the total list of industries you have now compiled, a smaller list of the industries to be sampled must be developed. This is a necessary and money-saving step for large systems, since the costs for sampling and analyzing the samples from several hundred industries may become prohibitive. There are several ways to determine which industries to sample. The simplest method is based on water usage--but caution is advised. Some discharges which are minor in flow, may be large pollutant contributors. Another approach relies on SIC Classification, with those industries identified as heavy metal or organic compound users given the most attention. A third method involves the use of the results from key manhole sampling, as described below. The final list will be created using a combination of these three methods along with any knowledge the personnel of the POTW may have concerning the industries.

The second step of Phase I is a preliminary sampling program of the influent, effluent and sludge. This program should last for at least six weeks, with samples taken every other working day. The reason for this amount of POTW sampling is simple. While flow variations at a POTW are small from day to day, pollutant loads can vary as much as 100 times from one day to the next. Thus, just a few samples may not give a fair picture of the true loading at the plant, and will not be statistically meaningful. This program will allow an assessment of the day-to-day variation of loadings into the POTW; in other words, how does Monday's load differ from Tuesday's or Friday's loads? A consistent, substantial variation will provide a pattern which suggests when certain industries should be sampled.

After the results of the sampling program have been submitted as part of the Phase I report, our Office will make a determination on whether additional sampling by the POTW is required for Phase II. This determination will be based on the statistical variation of the Phase I data.

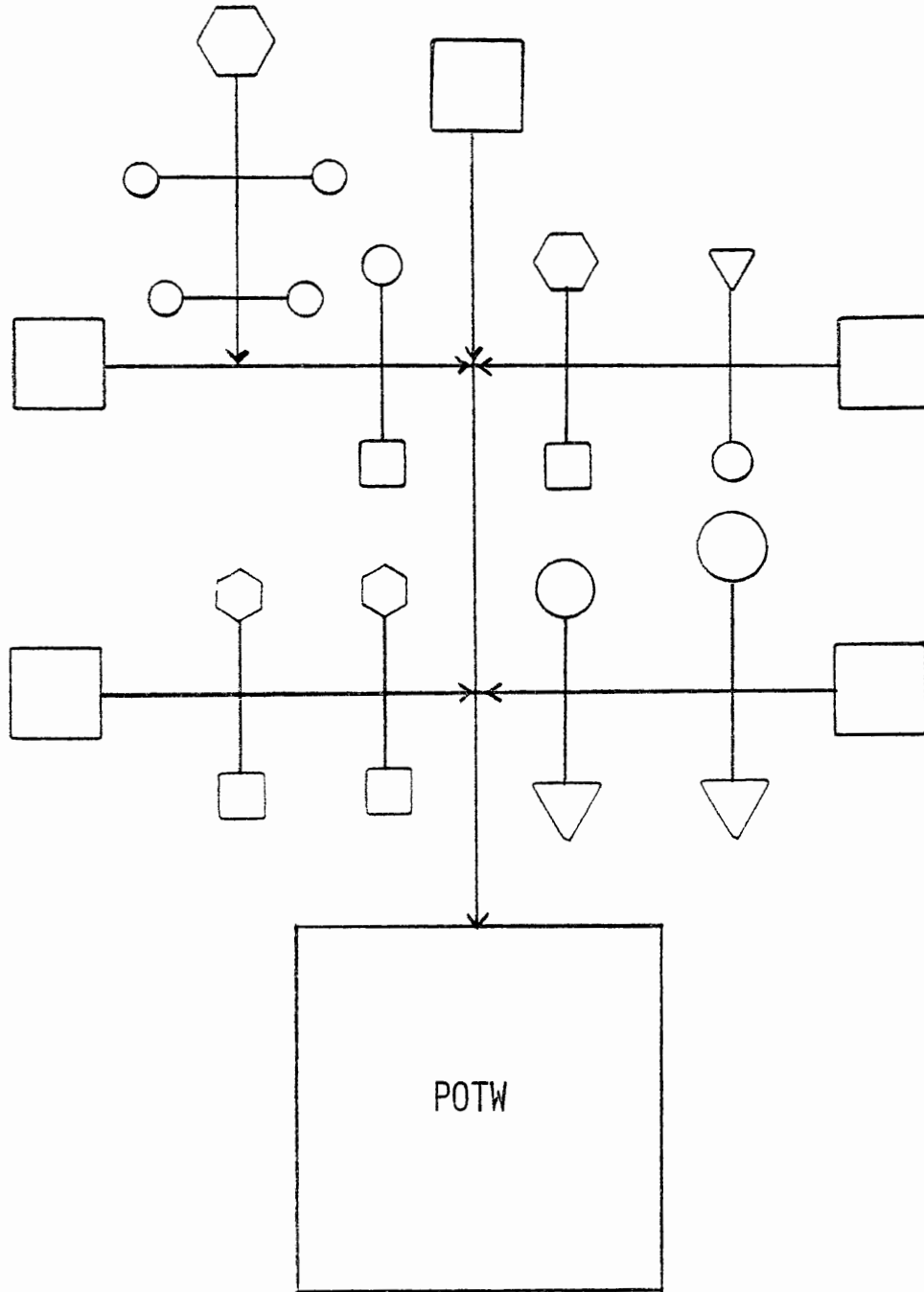
In conjunction with the POTW sampling program, key manholes previously identified are also sampled. The definition and significance of these key manholes calls for some elaboration. A key manhole can be explained as a point in the collection system that serves a defined portion of the service area. This portion, or sub-area, can have a distinctive land-use feature, such as being strictly residential or heavily industrialized. The number of key manholes will vary, of course, depending on the size of the system. Smaller POTW's may have only two or three, while larger systems may have as many as twenty or thirty. Figure 1 illustrates the importance of the key manhole network.

The division of the service area into these portions will allow easier isolation of those areas needing the most attention due to high loadings. Identification of the source of a specific pollutant becomes much easier if the sub-area from which the pollutant load is discharged is known.

As mentioned previously, the results from the key manhole sampling can affect the list of industries to be sampled. Obviously, if an industry discharges to a manhole where the results indicate only a small heavy metal contribution, then that industry need not be sampled for heavy metals. We recommend that each manhole be sampled more than once to order to increase the statistical significance.

FIGURE 1

KEY MANHOLE ILLUSTRATION



Those of you who have had experience in the wastewater field will recognize that this approach is very similar to an Infiltration/Inflow Analysis. It has been found that without a key manhole network to break up the service area into sub-areas, the I/I analysis becomes totally unmanageable. Such will be the case with the Industrial Waste Survey if this approach is not taken. The Office of Sludge Management and Industrial Pretreatment feels strongly that limiting the survey to just end-of-pipe sampling of selected industries will create large information gaps in the program.

The residential contribution is important in order to establish a baseline contribution of metals into the POTW. This will be the level of pollutant concentration in the influent even if 100% pretreatment is attained. The way to calculate the residential contribution is to sample a key manhole that serves a strictly residential area, and then establish the actual population for that area. From here it is a simple step to develop the loading per capita per day. Multiply by the number of people served by the sewer system to find the overall baseline contribution.

The final part of the Plan of Study is the laboratory quality assurance program. The significance of this program cannot be overstated. When we are talking about pollutant concentrations in the parts per billion range, unsatisfactory laboratory analyses will make the results of the survey next to meaningless.

In the second phase or Plan of Attack, with an established list of industries to sample, there are a number of sample types to consider for each discharger. For a small input, a simple grab sample or a composite of several grab samples may suffice. For a larger input, a 24-hour composite sample is recommended. For the very large discharges, ones that you are reasonably certain are large contributors, we recommend at least one 7-day, 24-hour composite sample. If the industry has large pollutant variations in its discharge, taking more than one such sample is the most prudent course of action.

The actual constituents to be analyzed are listed below. Analysis is required for substances listed in Table A.

TABLE A

BOD	Cadmium
COD	Copper
Total Solids	Chromium
Oil & Grease	Lead
Cyanide	Mercury
Phenolic Compounds	Nickel
	Zinc

Table B lists additional pollutants for which you may wish to test, depending on past inputs to the plant. The influent or the sludge may be checked for these compounds to determine whether a problem with any of them is likely. If any of these constituents turn up in higher than normal concentrations, an attempt to isolate sources may be worthwhile, since these substances can inhibit microbiological processes in your treatment plant.

TABLE B

Aluminum	Thallium
Arsenic	Sulfate
Beryllium	Chloride
Selenium	Phosphorus
Vanadium	MBA's

A major unanswered question at present is the extent of toxic organic analysis which should be required, especially for the 129 "priority pollutants". At the moment, our Office is caught between common sense and the normal DEP desire to over-regulate. We realize how costly the quantification of organic compound loads in a wastewater sample is, but we also recognize that some of these compounds are potential hazards to the treatment processes, to the waters receiving your effluent, and to the sludge management effort. Therefore, I'd like to outline several possible paths you may choose to follow.

1. Identify those industries that use the "priority pollutants" in their processes, and analyze just those industries for low-molecular weight organic compounds. If these are present in high quantities, it may indicate the presence of higher-molecular weight organic compounds.
2. Perform gas chromatographic scans on samples taken from key manholes. If the scans indicate a high concentration of a particular type of organic compound, more testing of the industries within that sub-area can reveal the source of the compound.
3. In conjunction with these possibilities, the samples taken of each industrial discharge can be frozen. This would allow back-checking of samples if an organic compound does show up in either a key manhole, the effluent or the sludge.

Finally, after you have finished all the sampling and testing -- what's next? The interpretation of the results is equal in importance to the results themselves. You can perform mass balances at each key manhole, comparing the identified industrial

and residential loads to the observed values. You can compare the total loading into the POTW with the loading from the industrial sources. Perhaps there are large, undetermined sources of pollution that need further investigation.

The basic objective of the final report is to determine the effect of full attainment of technology-based pretreatment limits on the industrial contribution to the system, and on the plant's effluent. Some simple calculations, including the residential contribution to the plant and the metal removal efficiency of the plant, can give the expected pollutant concentrations in the sludge after pretreatment. After all, this was one of the goals of the program, the removal of contamination in the sludge, so that sludge can be used as the resource we all know it to be.

TR:R17:A1-8:T

Source Monitoring for Toxic Substances
in a
Municipal Collection System

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Introduction:

Congress significantly amended the Federal Water Pollution Control Act by the Clean Water Act of 1977 (CWA), largely as a result of national emphasis on controlling toxic pollutants. Toxic pollutants, also called priority pollutants, include at least 65 listed toxic substances and categories of substances resulting from the 1976 suit by the Natural Resources Defense Council (NRDC) and others. The list of 65 was later redefined as 129 specific inorganic and organic compounds. The Environmental Protection Agency has developed a comprehensive program to promulgate industrial effluent guidelines to control the 129 toxic substances.

The Office of Water Planning and Standards (OWPS) was given the responsibility to develop a comprehensive regulatory strategy for toxic pollutants in the urban systems. Developing the strategy requires: 1) the assessment of the magnitude of toxic materials in urban stormwater runoff, 2) characterization of the fate of toxics in the Publicly Owned Treatment Works (POTW) treatment process, 3) the identification of best regulatory control strategy to achieve desired POTW wastewater effluent water quality standards, and 4) determining the sources and extent of toxic pollutants which enter POTW's. Knowledge of the sources of toxic chemicals is essential for an effective pretreatment program as well as for an overall urban toxics control strategy.

In order to assess the sources, types and concentrations of priority pollutants entering POTW's, a two-phased program was implemented: a pilot study in one city, and a full-scale sampling and analysis study at five to ten other cities, ranging from non-industrialized to heavily industrialized. The pilot project had several objectives:

- o To assess the feasibility of determining the relative contribution of various sources of priority pollutants.
- o To test the sampling protocol and operational aspects of sampling and chemical analysis.
- o To provide data on priority pollutant loads in a specific POTW.
- o To furnish the basis for extending the pilot program to a full-scale sampling and analysis study of at least five more POTW's.
- o To determine the reliability of the analytical methods.

To date, we have completed the pilot project and have sampled the first city of the full-scale follow-up project. This paper will concentrate on the planning, sampling, analysis, Quality

Assurance and Quality Control, and data interpretation of the pilot project.

Developing the Sampling Plan:

Prior to selecting the pilot city, a literature search was conducted to establish:

- an overview of the nature and extent of toxic pollutants in POTW influents, along with information on contributors to POTW influent.
- the frequency of occurrence, range of concentrations, and variation of toxic pollutants in POTW influents.

The search was limited to information developed in this decade because of the changes in analytical methods and sensitivities which make older data suspect.

As might be expected, very little information existed which offered any substantive insight into sources of toxic substances to municipal wastewater (18% of all references reviewed). An extensive data base exists for cadmium, copper, chromium, nickel, and zinc; a moderate data base for arsenic, lead and mercury; and a limited data base for selenium, beryllium, silver and thallium. Three studies support the conclusion that domestic contributions of metal priority pollutants are in the range of: 18-70% for cadmium, 3-40% for chromium, 16-85% for copper, 13-60% for lead, 18-55% for nickel, and about 30% for zinc. Several studies indicated that runoff also makes an important contribution of metal pollutants. Data were found in the literature on 31 of the 114 organic priority pollutants. Those compounds occurring in highest concentration were chloroform, halomethanes, chloroethanes, ethyl benzene, and toluene. Information found on residential, industrial or other sources of organics was incomplete and inconclusive.

The POTW chosen for the pilot project was selected because of previous EPA experience in sampling that particular POTW, although for this study the collection system was monitored as well. The treatment area 's general characteristics (suburban location, type of sewer systems*, mix of residential and commercial areas, etc.) were felt to be desirable for the pilot source study. The contractor visited the officials of this metropolitan sewer district, and the supervisor of the POTW. This later proved to be one of the key steps in planning the monitoring project. The local contacts provided us with an in-depth view of the POTW sewer system and the urban areas. They suggested possible locations for sampling, and provided detailed sewer maps of the area and a survey crew to help locate manholes. The contractor also scrutinized 208 and 201 planning documents, census information, street maps, and other information useful in characterizing the area. All of this information was essential in order to

*combined, separate, ability to isolate

characterize the pilot project test site so that the loading of the priority pollutants could be ultimately related to economic, demographic, and other factors characterizing the treatment area. No one source of data was sufficient to characterize the area. In summary, the approach was to characterize the total treatment area in general, and the individual "sampling sites" in more detail. Parameters of interest were:

area	land use
population	general traffic
topography	rainfall
number, age, & type of residences	
types and numbers of commercial and industrial establishments	
types of institutional facilities (hospitals, schools, etc.)	

The pilot city contained a combination of open areas, new housing developments, older residential communities, several golf courses and other recreation areas, schools and seminaries, shopping centers, commercial areas, and a small amount of industrial activity. The 208 plan lists the following zone classification for the area:

Residential	96.6%
Retail Business & Offices	1.0%
Light Industrial	1.7%
Heavy Industrial	0.7%

The land use classification given in the 208 plans are:

Residential	54.4%
Institutional	3.2%
Retail Business & Offices	2.5%
Light Industrial	3.0%
Recreational	3.1%
Undeveloped	23.6%
Proposed Development	7.2%

Using the results of the visits and information assessment, a rational basis was developed for the number and type of samples to be taken in the pilot study. Factors which influenced the plan included: locations, accessibility, size, coverage, and branching of the sewers and the level of detailed information available on them; the concentration and location of industrial, commercial and residential zones in the treatment area; EPA sampling methods and analysis protocols; proposed quality assurance procedures; anticipated confidence in the program results; laboratory analytical capabilities and schedules; sampling logistics; proposed EPA schedule; coordination with other contractors, etc.

Seven sampling points were selected for the urban area source characterization. The sites represented the following generally described areas:

<u>Sources</u>	<u>Code Name</u>
- tap water	tap water
- residential-commercial/ sanitary	DSC
- old residential/combined	ES
- new residential/sanitary	KRK
- residential-commercial industrial/combined	GPS
- residential-industrial/ combined	CD
- industrial/sanitary	SGH
- influent to POTW (inlet to grit chamber)	POTW Influent

Sample Collection:

For the purpose of the pilot study, it was decided that manual collection techniques in conjunction with flow proportional compositing would be used. Automatic samplers were eliminated from consideration because none on the market had the ability to collect and retain the volatile organic species that appear on the priority pollutant list. Flow proportioning is more attractive as it takes into account perturbations in flow patterns that may coincide with increased levels of pollutant discharge (in terms of mass). This technique also factored infiltration inputs more reasonably.

Because of the concerns with personnel safety in sewer systems, manual sampling consisted of coupling a telescoping pole (32 feet maximum) to a 2-liter stainless steel bucket. This was supplemented with hand dipping where low flow conditions existed. Usually, a one-liter size bottle was used for a particular fraction. Each sampling point was sampled every 3-4 hours in accordance with a prearranged plan.

Sample collection consisted of several steps:

- determining temperature, pH, presence of oxidizing species
- filling individual sample bottles (usually one-liter)
- sample fraction identification and logging same into the field notebook
- sample preservation and temporary packing in ice
- determination of a depth-of-flow measurement

The Volatile fraction, Acid and Base Neutral fraction and the PCB/Pesticides fraction were segregated for rapid air shipment back to the contractor's laboratory, while the rest of the samples were retained under refrigeration on-site until such time as they could be trucked to the laboratory. Air shipments were packed in ice in sealed chests.

A total of 69 composite samples were collected for the generation of 140 samples for analysis, with the balance used in the quality assurance and quality control programs. Samples were analyzed for all 129 priority pollutants (adding manganese but excluding asbestos), and the classical parameters of pH, temperature, TSS, TOC, BOD, COD, ammonia, and oil and grease.

Chemical Analysis:

The basic procedures used for chemical analysis were those described in the EPA "Sampling and Analysis Procedures for the Screening of Industrial Effluents for Priority Pollutants".

The one-liter samples from the pilot project were composited in the laboratory using volumetric flow proportioning. An analysis was produced for each time period and sampling site. The composited samples were divided into aliquots for nine categories of priority pollutants. The categories of compounds for which the composited sample was analyzed, and the aliquot volumes, are indicated in Figure 1. The Volatile and Acid and Base/Neutral categories were spiked with internal standards. The following is a brief description of the methods by compound category.

Volatiles

The Volatile category includes 32 priority pollutant compounds. The sample was prepared for analysis by the purge and trap technique. A 5 ml sample aliquot was purged with helium gas into a sorbent trap. The trapped volatiles were subsequently thermally desorbed from the sorbent trap onto a Carboxpack gas chromatographic column. The identification and quantification of the compounds were achieved, using an automated gas chromatograph/mass spectrometer instrument (GC/MS).

Acids

The Acid category includes 12 priority pollutant compounds. The 1L sample aliquot was prepared for analysis by extraction into a methylene chloride solvent at pH less than 2. The extract was concentrated to a known volume and chromatographed with an acid deactivated polyester (Supelco's 1% SD 1240DA) gas chromatographic column interfaced with the GC/MS.

Base Neutrals

The Base/Neutral category includes 48 priority pollutant compounds. The 1L sample aliquot was prepared for analysis by extraction into methylene chloride at a basic pH greater than 11. The extract was concentrated to a known volume and chromatographed onto a methyl-phenyl silicone (Supelco's 1% SP2250) gas chromatographic column, interfaced with the GC/MS.

ANALYSIS SAMPLE FLOW CHART

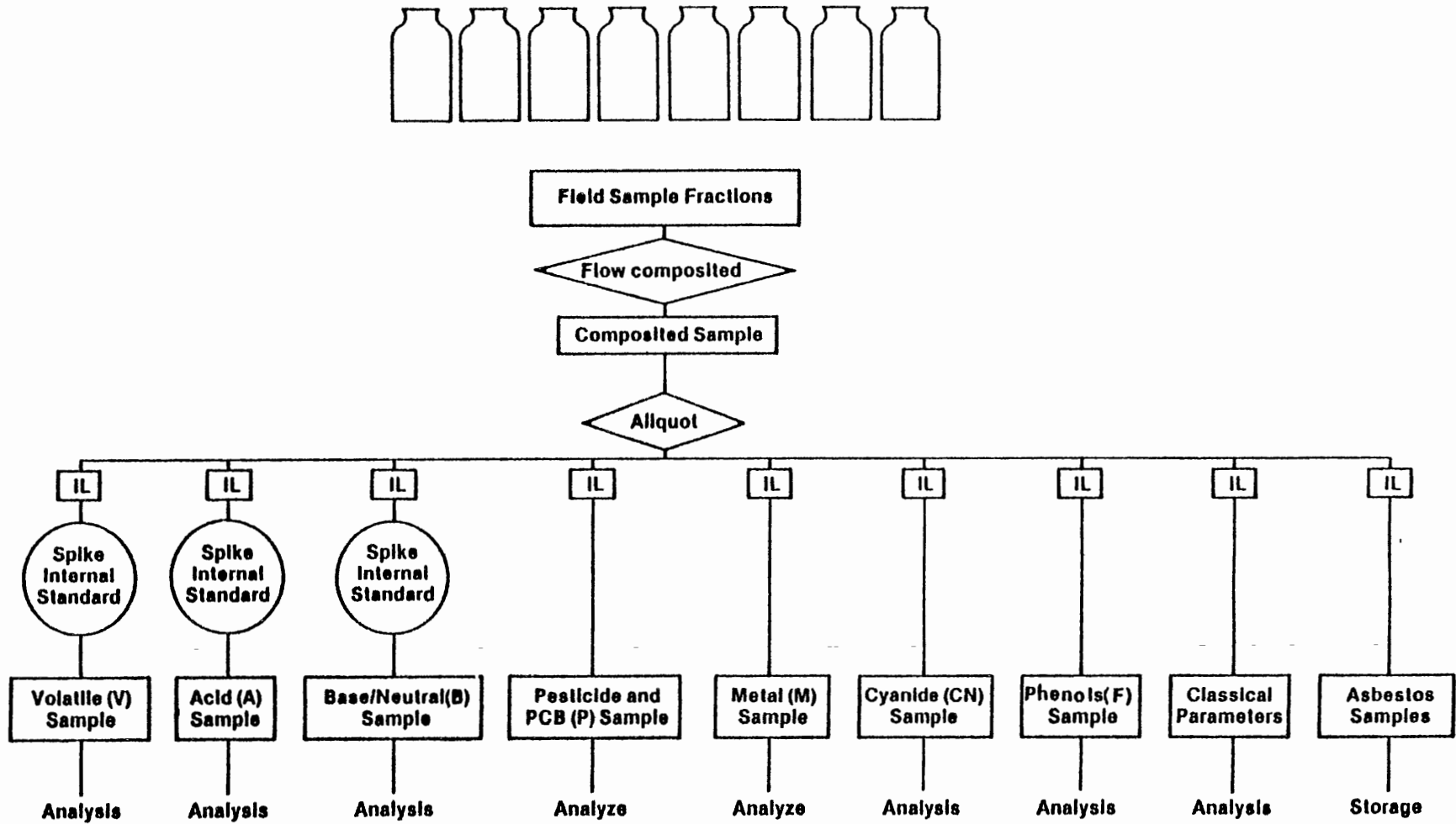


Figure 1: Analysis Sample Flow Chart

Pesticides and PCBs

The Pesticides and PCB category includes 23 priority pollutant compounds. The 1L sample aliquot was prepared by extraction into 15% methylene chloride/85% hexane. The extract was separated, using liquid adsorption chromatography on florisil. The elutants were concentrated to a known volume and chromatographed onto a methyl-phenyl silicone/trifluoropropyl silicone (Supelco's 1.5% SP2250/1.9% SP2401) gas chromatographic column interfaced with an electron capture detector (GC/ECD). Pesticides and PCBs were quantified using the GC/ECD system, and a preliminary identification was obtained by comparing retention times with known compounds. Any pesticides and PCBs tentatively identified were confirmed using GC/MS techniques.

Total Cyanides

The sample aliquot was prepared by distillation. The distillate was reacted with chloramine T to produce a dye complex. The absorbance of the sample was determined, using colorimetric procedures.

Total Phenols

The sample aliquot was prepared by a distillation technique. The distillate was reacted with 4-aminoantipyrine to produce a dye complex. The complex was extracted into chloroform. The absorbance of the sample was determined, using colorimetric procedures.

Metals

The Metals category included 15 priority pollutant elements. The sample aliquot was prepared by an acid digestion technique. The elements were analyzed, using atomic absorption spectrophotometry.

Asbestos

The 1L sample aliquots for asbestos analysis were preserved with mercuric chloride and stored at 4 C.

Classical Parameters

Appropriately-preserved sample aliquots were analyzed for total suspended solids (TSS) biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), ammonia (NH₃) and oil and grease (OG).

Quality Assurance/Quality Control (QA/QC):

A quality assurance program was established for this study in order to be able to document the reliability of the data obtained on pollutants found in the samples. Figure 2 is a schematic of what was done to the QA/QC samples from sampling to analysis. For the samples where QA/QC was being performed, the

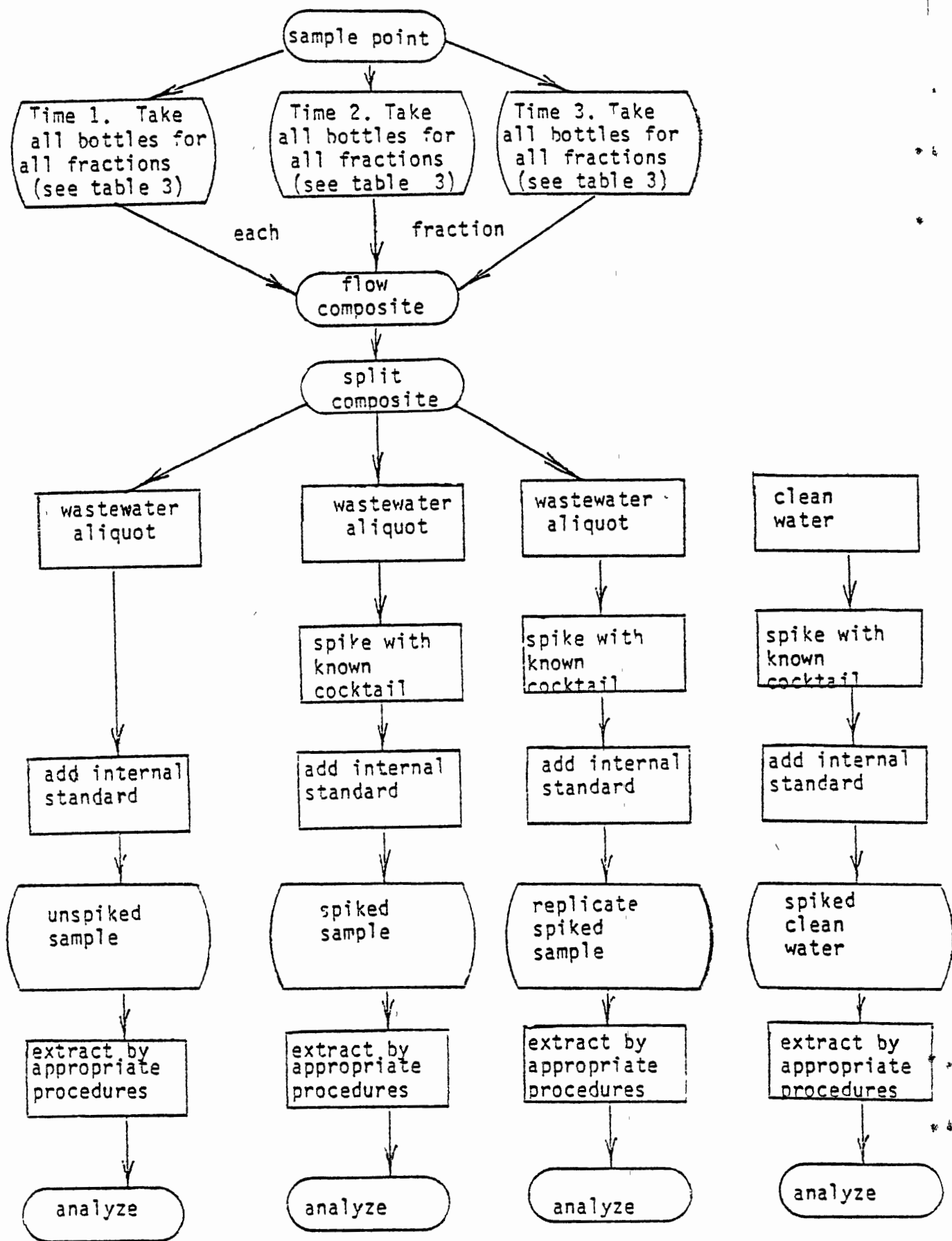


Figure 2. QA Sample Schematic

composite for each fraction was initially three liters instead of one. The composite was then divided into three parts. One part was extracted, dried, concentrated, and analyzed according to the standard analysis. The remaining two portions were spiked by adding the appropriate pollutant "cocktail". In as many cases as possible, the cocktail contained all of the priority pollutants, in known amounts, for that specific fraction. The cocktail was also added to a sample of clean water (a milli Q), the "Methods Reference Sample". In summary, there were four analyses which had to be done for each fraction of each QA/QC sample:

- unspiked wastewater sample
- spiked wastewater sample
- replicate spiked wastewater sample
- spiked clean water sample

The spiked samples indicated the efficiency of recovery through the extraction process. Reproducibility information was derived from the replicates.

The laboratory was required to perform calibration curves for each pollutant daily, using the pollutant cocktails. Laboratory blanks and field blanks were also run daily. The purpose of the blanks was to detect contamination of samples, specifically, false positive indications.

Results

The pilot project provided a considerable amount of information and fulfilled its objectives. The overall results look very good considering the fact that the analytical methodology was primarily intended for screening. Most recovery values are in the 80-100% range, and the precision is about 25-30%. Results are about the same for each analysis category, showing the lack of any particular procedural bias. The project also indicated that the sampling protocol has some weaknesses. However it is important to note that the quality control aspects of the analysis program contributed significantly to the quality and credibility of the data.

Obviously, the pilot project is only one data point in the overall project to identify sources of toxic substances in a municipal collection system. However, the results obtained indicate that the overall project might be very successful.

Very few of the priority pollutants (24 organics and 13 metals) were found during the pilot project. Those that were found were at concentrations generally less than 10 ppb, relatively close to the detection limits of the methods. The only chemicals present at relatively high concentrations were chloroform, bromodichloromethane, dibromochloromethane, copper, manganese and zinc (Table 1).

TABLE 1

AVERAGE CONCENTRATION VALUES (ug/L)
ORGANICS

	TAP WATER	POIW INF	KRK	SGH	ES	DSC	GPS	CD
Purgeables (VOA)								
1,1-Dichloroethylene	-	-	-	-	-	-	-	-
Chloroform	40	3	2	12	3	5	4	-
1,2-Dichloroethane	-	0.5	-	-	-	-	0.7	-
1,1,1-Trichloroethane	-	0.3	-	-	0.7	1	4	-
Bromodichloromethane	17	-	-	10	0.2	2	0.7	-
Dibromochloromethane	15	-	-	7	0.3	1	1	-
Chlorobenzene	-	-	-	-	1	-	-	-
Benzene	-	4	-	1	0.2	0.3	3	-
Ethyl Benzene	0.2	1	0.2	-	2	3	4	-
Bromoform	1	-	-	2	-	-	-	-
1,1,2,2-Tetrachloroethylene	-	1	0.5	-	3	7	3	3
1,1,2,2-Tetrachloroethane	-	1	-	-	0.5	-	-	-
Toluene	-	2	0.8	-	6	6	18	1
Trans-1,2-dichloroethylene	-	-	-	-	-	0.3	-	-
Acids								
Phenol	-	-	2	-	20	5	4	-
2,4-Dimethylphenol	-	-	-	-	-	-	-	-
Pentachlorophenol	-	4	-	-	-	-	-	-
Base/Neutrals								
Naphthalene	-	4	-	-	2	1	3	-
Diethyl phthalate	2	12	19	5	31	13	16	8
Di-n-butyl phthalate	14	12	19	44	13	36	20	11
Bis(2-ethylhexyl)phthalate	16	4	7	28	12	24	15	6
Butyl benzyl phthalate	-	-	7	-	2	2	6	-
Anthracene/Phenanthrene	-	-	-	-	-	-	-	-
Dichlorobenzenes	-	-	-	-	-	3	-	8
Heptachlor	-	0.5	-	-	-	-	0.3	-

TABLE 1 (Cont'd.)

Average Concentration Values (µg/L)
Metals, Total Cyanides and Total Phenols

	TAP WATER	POTW INF	KRK	SGH	ES	DSC	GPS	CD
Silver	1	4	1	15	-	2	1	3
Arsenic	6	23	19	4	16	9	8	14
Beryllium	-	-	1	-	-	-	-	-
Cadium	2	2	-	-	-	2	2	1
Chromium	10	158	7	-	17	-	-	-
Copper	28	66	144	735	107	36	60	39
Mercury	-	-	-	-	-	-	-	-
Manganese	7	347	81	27	132	457	320	367
Nickel	13	42	-	-	10	15	25	13
Lead	-	20	5	95	38	3	35	8
Antimony	-	-	-	-	3	2	-	1
Selenium	4	5	4	11	6	5	1	11
Thallium	-	-	-	-	-	-	-	-
Zinc	44	322	131	193	134	141	142	157

Total Cyanides	-	41	-	-	-	-	-	-
----------------	---	----	---	---	---	---	---	---

Total Phenols	8	25	28	53	81	36	36	27
---------------	---	----	----	----	----	----	----	----

Some of the pollutants were observed very few times. Figure 3 provides some perspective on occurrence vs. concentration. Of the 24 organics observed, ten were detected less than five times (Figure 3).

It was estimated that the source locations studied accounted for approximately 40% of the flow to the plant. It was possible to account for most of the pollutants found in the study. Chloroform was high in the tap water but seems to be reduced by the time it reaches the POTW. In general, the number of organics observed in the samples seems to be higher in the commercial and industrial sources than the residential sources. The metals seem to be about the same for all of the sources examined. This might be indicative of the non-industrialized character of the project site.

Results from the pilot project were compared to data obtained from a 1976 study of the same city by the Office of Research and Development. Although there were significant differences in sampling techniques (grabs vs. composited grabs), with one single exception, arsenic, the data agree very well (Table 2). There were 22 pollutants in the influent that were looked for in both studies. The detection limits for the pilot project differed from those for the 1976 study. Pollutants which showed up fairly often in the latter study at levels below one ppb would have been reported as undetected (less than one ppb) in the pilot project.

Figure 3

Frequency Distribution of Observed Pollutants for First 38 Samples

Organics

Number of Observations

	0	5	10	15	20	25	30	35	40
1,1-Dichloroethylene	0								
Chloroform									37
1,2-Dichloroethane	2								
1,1,1-Trichloroethane			9						
Bromodichloromethane					16				
Dibromochloromethane				13					
Chlorobenzene	1								
Benzene				14					
Ethyl Benzene				15					
Bromoform		4							
1,1,2,2-Tetrachloroethylene							24		
1,1,2,2-Tetrachloroethane	2								
Toluene					21				
Trans-1,2-dichloroethylene	2								
Phenol					18				
2,4-Dimethylphenol	1								
Pentachlorophenol	1								
Naphthalene				14					
Diethyl phthalate							28		
Di-n-butyl phthalate							24		
Bis(2-ethylhexyl)phthalate							24		
Butyl benzyl phthalate		6							
Anthracene/Phenanthrene	1								
Dichlorobenzenes	2								
Heptachlor	3								

Table 2

COMPARISON OF 1976 RESULTS WITH 1978 RESULTS
(POTW Influent)

Pollutant	(1976)		(1978)	
	freq.	range*	freq.	range*
1. arsenic	0/20	1.5	6/6	12-35
2. cadmium	20/20	0.8-150	4/6	3-4
3. mercury	10/20	0.5-3.3	1/6	2
4. cyanides	20/20	10-410	4/6	30-100
5. chloroform	19/20	0.7-9	6/6	2-5
6. trichloroethylene	12/20	0.2-2.3	0/6	1
7. benzidine	1/19	0.3	0/6	1
8. vinyl chloride	0/20	1	0/6	1
9. benzene	9/20	0.3-2	6/6	2-4
10. PCB's	0/5	1	0/6	1
11. endrin	0/5	1	0/6	1
12. toxaphene	0/5	1	0/6	1
13. carbon tetrachloride	0/20	1	0/6	1
14. dibromochloromethane	4/20	0.1-0.3	0/6	1
15. bromodichloromethane	11/20	0.1-1	0/6	1
16. bromoform	5/20	0.1-3.6	0/6	1
17. 1,2-dichloroethane	1/20	0.4	1/6	3
18. methylene chloride	18/20	0.2-70	5/6	1-100+
19. 1,1,1-trichloroethane	2/20	0.3-0.4	2/6	1
20. tetrachloroethylene	16/20	0.2-9	3/6	1-3
21. toluene	3/15	1-5	2/6	2-11
22. acrolein	6/15	20-80	0/6	1

*ranges are in ppb for pollutant where found. If not found, the detection limit is given under the range column.

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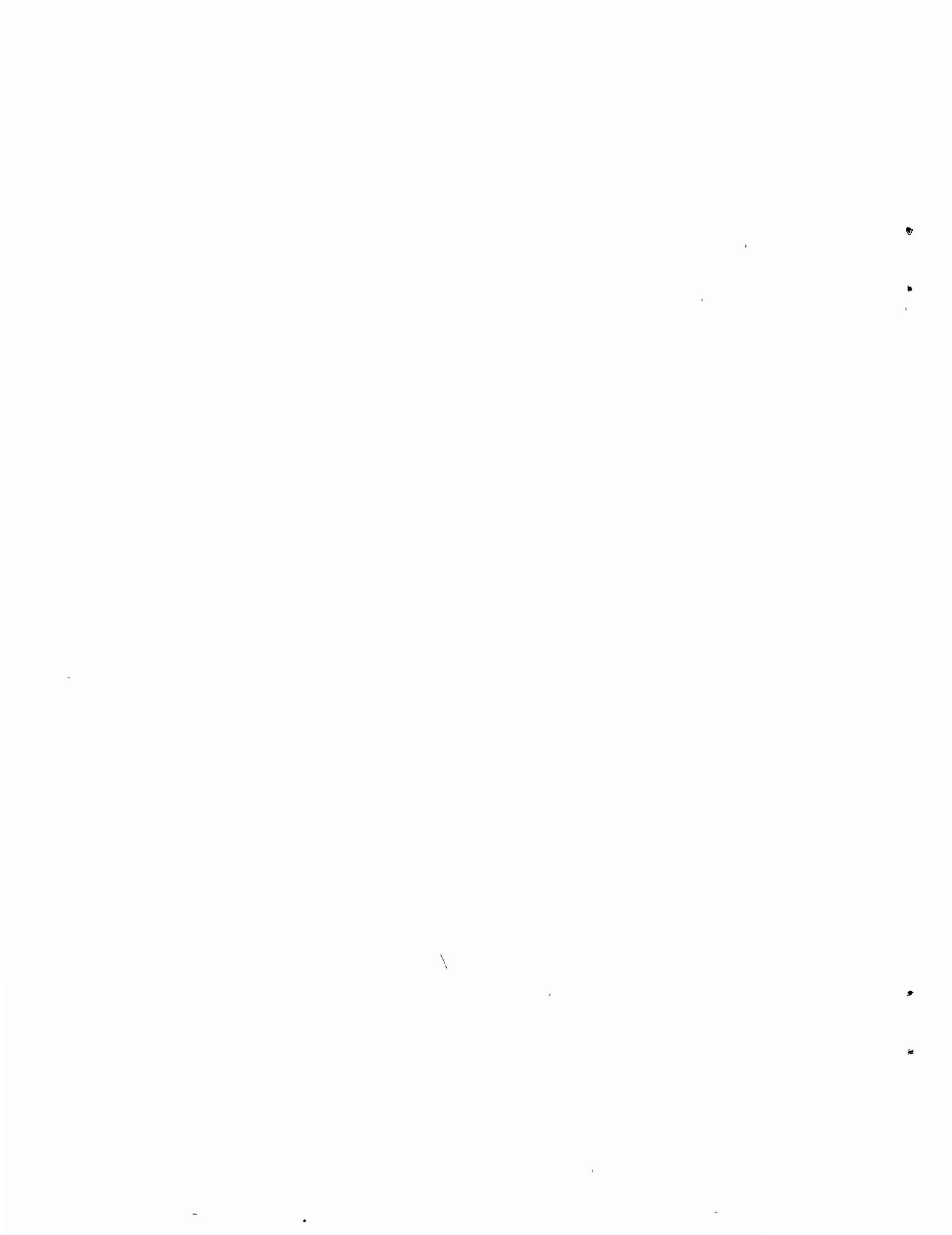
1. "Non-Industrial Sources of POTW Priority Pollutant Burden", Draft Final Report, EPA Contract No. 68-01-3857, November, 1978.
2. Internal Memorandum: "QA/QC Summary for POTW Sources Pilot Project", Michael Callahan, November 29, 1978/December 11, 1978.
3. Internal Memorandum: "Comparison of MERL and MDSD Data for (project city)", Michael Callahan, November 29, 1978.
4. Briefing Package: Arthur D. Little, Inc. for EPA.

TR:815551-922885:H

Hazardous Waste Management in New Jersey

History and Status

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Chief, Bureau of Hazardous Waste
Solid Waste Administration
N.J. Department of Environmental Protection



In 1974, information on the volume and characteristics of hazardous wastes generated within the state was inadequate and difficult to compile. However, it was apparent that the volume of hazardous waste produced each year was substantial, and was increasing drastically. This incremental volume of waste is a by-product of increased municipal and industrial waste treatment, which often produces sludges containing hazardous materials. The gradual phase-out of ocean dumping is also increasing the amount of hazardous wastes which must be disposed of by alternate means.

LEGAL MANDATES

On July 1, 1974, the Commissioner of the Department of Environmental Protection adopted major revisions in the Rules of the Bureau of Solid Waste Management. These revisions included the definition and identification of hazardous wastes, chemical wastes, lethal chemicals, bulk liquids, and semiliquids to be specifically regulated; a prohibition against the land disposal or incineration of lethal chemicals and radioactive wastes without prior written approval of the Department (N.J.A.C. 7:26-2.6.3); and a delineation of the responsibilities of the generators, haulers and disposers of hazardous, chemical, or bulk liquids (N.J.A.C. 7:26-2.6.4), including a six-month storage limitation to protect the public health and welfare. N.J.A.C. 7:26-2.6.4.4. prohibited land disposal of hazardous, chemical, or bulk liquid wastes after March 15, 1975, unless the disposer had installed a leachate collection and treatment system approved by D.E.P. On March 14, 1975, the Commissioner suspended the effective date of this regulation for a period of six months due to the lack of facilities that had such systems in place. This period also permitted the study of existing and innovative methods of handling, recovery, treatment, and disposal of such waste.

On March 31, 1975, a public hearing was held by the Department concerning, among other proposals, a new definition of hazardous waste. Comments received at the public hearing were addressed to three major areas of concern. First, the rule did not address itself to the condition and circumstances under which certain materials might become more or less hazardous. For example, some substances which would be hazardous in themselves could be rendered harmless through land disposal. The Occupational Safety and Health Act (OSHA) standards which were cited in the proposed definition are intended to prevent hazards to workers and may not be applicable to land disposal of these same materials in the form in which they are commonly disposed of.

Second, there were major objections to the listing of certain materials as being hazardous, and to the listing of other materials as being hazardous without reference to concentrations.

Third, some testimony criticized the list of properties by which the Department would designate materials as hazardous. Major criticisms were that: the parameters did not actually measure the hazard associated with land disposal of the wastes; standardized test procedures for determining these parameters were not cited, and in some cases may not exist; and implementation of the rule, as proposed, would be extremely costly and time consuming, thus significantly delaying disposal of these wastes.

On September 15, 1975, the Commissioner indefinitely suspended the effective date of the aforementioned rule requiring leachate collection and treatment, while proposing a new rule prohibiting or severely limiting the land disposal of certain highly toxic, corrosive, carcinogenic, or explosive chemical substances. This regulation left open the possibility of land disposal for the prohibited materials, if it could be demonstrated to the Department that such disposal would not adversely affect the environment, and was the only practicable disposal technique available for such wastes.

INDUSTRIAL WASTE SURVEY

In July of 1976, the Department closed the last remaining commercial landfill that had accepted hazardous wastes, Kin-Buc I, due to severe adverse environmental impacts. Subsequent to the closing of the Kin-Buc I facility to chemical wastes, the Department sought and obtained from the owners a list of the major industries within the region that had been disposing of wastes in that site. With this information on hand and other facility records, it was estimated that Kin-Buc was accepting in excess of 100 million gallons per year of chemical wastes. These wastes were found to originate in some 14 states, as far distant as Maine and North Carolina.

Upon closing the site, a flurry of hazardous waste inquiries were anticipated from New Jersey-based firms. This, in fact, was not the case. The number of calls concerning hazardous and chemical waste disposal was surprisingly small, and it was decided to investigate the disposal of wastes from "all" industrial firms within the State. In order to accomplish this task, the Department developed a list of SIC code numbers, and extracted the names of some 14,500 firms within the State. Next, an industrial waste survey questionnaire was developed and, as a pretest, sent out to the 200 New Jersey firms that had been using the Kin-Buc Landfill site. The initial response to this questionnaire was excellent--approximately 75%--and in order to obtain the outstanding responses, the remaining firms were contacted by another mailing, by phone, and/or by field representatives who conducted personal interviews. All of New Jersey's former Kin-Buc customers have now responded to the survey, and it appears that most of these wastes are being properly handled.

With this initial experience, the final details of the questionnaire could be "ironed-out", and corrections made. The revised survey was then distributed to the remaining industrial firms on our list. Responses are being received currently.

HAZARDOUS WASTE MANAGEMENT

In conjunction with the survey task, the Department entered into a contract with Roy F. Weston, Inc., consulting engineers, to aid in developing an overall hazardous waste management plan for the State. The basic goals of this study were to:

- Assess the hazardous waste problem in New Jersey (based on surveys and case histories, such as the Kin-Buc landfill);

- Evaluate hazardous waste technology (handling, treatment and disposal) and its applicability to New Jersey;
- Develop criteria for hazardous waste processing facilities (handling, treatment and disposal);
- Develop a statewide hazardous waste management plan recommendation; and
- Develop hazardous waste implementation plans (regulating, enforcing, administrating, staffing and training needs).

This study was completed in August of 1977.

Moreover, in October of 1976, the United States Congress amended the Solid Waste Disposal Act to include general provisions known as the Resource Conservation and Recovery Act (RCRA), of which Subtitle C encompasses hazardous waste management. This law required EPA to promulgate criteria and standards concerning:

- (1) Identification and listing of hazardous waste;
- (2) Generators of hazardous waste;
- (3) Transporters of hazardous waste;
- (4) Storage, treatment, disposal facilities;
- (5) Permits for storage, treatment, or disposal;
- (6) Authorized state programs;
- (7) Inspections;
- (8) Federal enforcement; and
- (9) Retention of State authority.

EPA then initiated preparation of such criteria and standards, however none of these sections have been promulgated to date.

The Department, rather than wait for the Federal regulations, and with the endorsement of EPA, secured a grant to continue, upgrade and expand the State's program. With this monetary allotment, new personnel and equipment were added to more effectively deal with New Jersey's hazardous waste problem.

MANIFEST

In July of 1976, the Department developed modified drafts of Weston's Proposed Regulations. It was decided to segregate the Manifest (waste tracking) System, formulate a Hazardous Waste Advisory Task Force consisting of industrial, environmental and Administration representatives to assist in reviewing these regulations, and prepare a finalized format for public hearing. The manifest cycle is designed to account for the waste from its point of generation to the point of ultimate disposal. This system allows the State to receive notice of a waste shipment from two points: First, from the generator when the waste is transferred from their control, and second from the waste management facility when the waste is treated and/or disposed of. Such dual reporting will aid the SWA in controlling illicit disposal of wastes, as well as responding to spills and incidents during transport. After numerous Task Force meetings and rule revisions, the

Manifest System was proposed by the Commissioner, and on November 18, 1977, a public hearing was held to obtain comment upon these regulations. In February, 1978, following receipt and review of all public comments, the final version of the Manifest System rules was prepared, sent to the Commissioner for adoption, and promulgated with an effective date of May 1, 1978. It should be noted that during 1978, the manifest tracked 400,000 tons of various chemical wastes generated throughout the State.

Figures 1 and 2, and Table 1 relate to the Manifest System. The figures show the process involved and the manifest form; Table 1 presents a quarterly report on the system.

FACILITY REGULATIONS

Having adopted manifest (and storage) regulations, the Administration initiated work on a separate set of facility regulations. These rules address the issues of facility siting, design, operation, closure, and perpetual maintenance. Subsequent to eight months of in-house work and Task Force revisions, these regulations were finalized. The regulations were proposed in the December New Jersey Register and, following public hearing, should be adopted by mid-year.

Concurrently, the Department developed a two-tier strategy for hazardous waste management--a long term and a short term approach.

LONG TERM STRATEGY

The long term strategy consists of attracting private companies into New Jersey to construct and operate facilities for the handling of chemical and hazardous wastes. We have made it clear to industry that we will not approve another Kin-Buc, but are looking for waste treatment facilities. Such a facility would biologically and chemically treat waste materials, with an attendant treated discharge into an adjacent river or into a sewerage system. It could also involve the operation of an incinerator. As a necessary adjunct, a secured landfill into which would be placed only solid hazardous and chemical waste could be operated. The source of this material would be sludges from the waste treatment facility itself, sludges originating from industries having waste treatment facilities, and a limited amount of solid chemical and hazardous waste that cannot be disposed of by any other means.

It would seem that at least eight additional hazardous waste facilities will be needed to handle the estimated volume of these materials generated within the State. This figure is based on the estimated potential hazardous waste to be generated within New Jersey, as summarized from EPA Data Reports, in Table 2. This has been approximated at 222,214 tons/year (dry) or about 2.2 million tons per year on a wet basis. Assuming a facility would be designed to handle approximately 266,000 wet tons per year, eight new facilities can be justified. Of course, not every facility will be capable of handling all of the various waste types generated, thus, there will always be a need for some out-of-state disposal. It must be realized that hazardous waste originating out-of-state will continually influx to New Jersey, displacing a portion of the available in-state capacity.

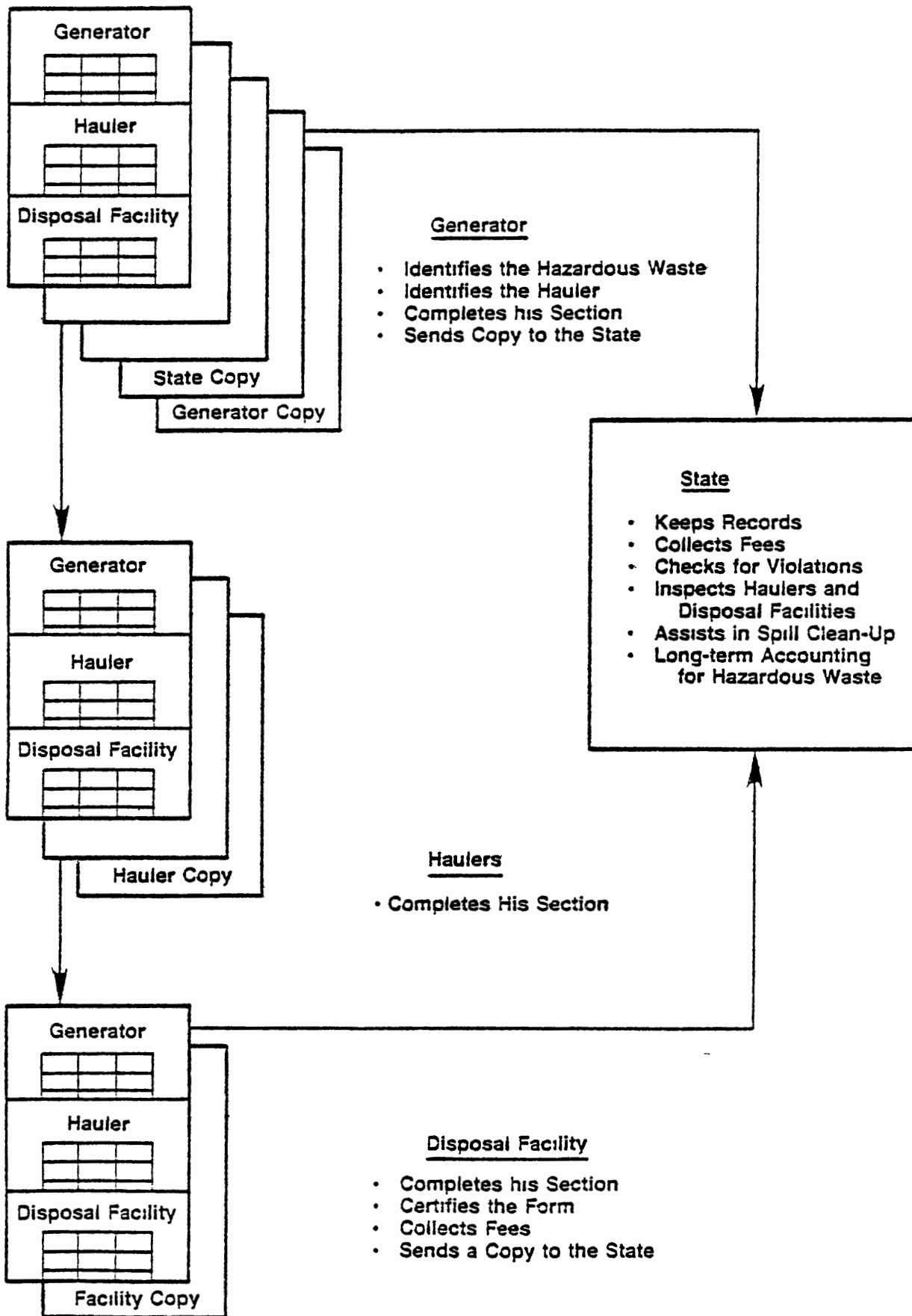


FIGURE 1 THE MANIFEST CYCLE

DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOLID WASTE ADMINISTRATION

A

SPECIAL WASTE MANIFEST

C 91999

SECTION I TO BE COMPLETED BY THE SPECIAL WASTE GENERATOR

Plant Identification Number Pick-Up Date MO DAY YR

Company Name

Pick-Up Address

Name of Hauler Address

Name of Facility Address

Handling Instructions Emergency Spill Phone Nos : 609 - 292 - 5560 or 609 - 292 - 7172

Waste Type	Number of Containers	Physical State	Hazard ID	Total Quantity Identify units in pounds or gallons use P for pounds and G for gallons	Pounds or Gallons	SECTION V TO BE COMPLETED BY THE SPECIAL WASTE FACILITY OPERATOR
						Rejected Amount
1 Acid Solution						
2 Alkaline Solution						
3 Arsenic Residues						
4 Catalyst Residues						
5 Cyanide Residues						
6 Chlorinated (Dioxin, Furan) Residues						
7 Etching, Pickling, & Plating Residue						
8 Explosive Residue						
9 Filter Clays Filter Aids						
10 Ester, Alcohol, Ether, Ketone, Glycol Residues						
11 Heavy Metal Residue						
12 Organic and Heavy Metal Residue Mixture						
13 Latex Residue						
14 Peroxide						
15 Oil and Oil Sludges, Emulsions						
16 Paint and Pigment Residues						
17 Pesticides						
18 Pharmaceutical Wastes (Drugs, etc)						
19 Lacramators, Amines, Mercaptans, Amide						
20 Plasticizer, Resin, Monomer, Elastomer Residues						
21 PCB,PBB Contaminated Materials						
22 Solvent, Halogenated Organic						
23 Solvent, Mixed						
24 Still Bottoms						
25 Radioactive Residue						
26 Tetraethyl Lead Residues						
Other (See Instructions)						
27						
28						
29						
30						

I certify that the above information is correct to the best of my knowledge
Date Signature and Title

SECTION II TO BE COMPLETED BY THE SPECIAL WASTE HAULER

I certify that the described quantity of material (s) listed in Section I was collected by me State Number
Date Signature Vehicle License Plate Number

SECTION III TO BE COMPLETED BY THE SPECIAL WASTE HAULER

Name of Hauler Address
I certify that the described quantity of material (s) listed in Section I was hauled by me to the Special Waste Facility named in Section I
Date Signature Vehicle License Plate Number

SECTION IV TO BE COMPLETED BY THE SPECIAL WASTE FACILITY

Name of Facility Address
Registration Number Date Waste Received Accepted Rejected
I certify that the hauler stated above delivered the waste described in Section I to this Facility
Date Signature and Title

TABLE 1

Quarterly Manifest Summary Report (5/1/78 - 7/1/78)
Tons of Materials Disposed of in New Jersey

<u>State of Origin</u>	<u>Acid Solution</u>	<u>Alkaline Solution</u>	<u>Oil and Oil Sludges</u>	<u>Solvents</u>	<u>Still Bottoms</u>	<u>Other</u>
New Jersey	13,710	5,827	4,693	8,718	3,494	23,925
Connecticut	286	47	200	113	9	160
Delaware	476	---	126	3	---	72
Massachusetts	---	---	---	100	---	25
Maryland	14	14	36	56	---	90
New York	223	603	192	5,200	148	1,677
Pennsylvania	2,375	148	71	597	77	2,750
Rhode Island	---	---	---	180	20	---
Virginia	---	---	---	32	---	---

TABLE 2

POTENTIAL HAZARDOUS WASTE
GENERATION IN NEW JERSEY, BY INDUSTRY

<u>SIC CATEGORY</u>	<u>INDUSTRY</u>	<u>QUANTITY</u> (Dry Metric Tons per year)
22	Textiles	1,886
281	Inorganic Chemicals	47,710
282	Plastic Materials and Synthetics	6,410
283	Pharmaceuticals	17,920
2851	Paints and Coatings*	6,605
286,287,289	Organic Chemicals**	53,840
2911	Petroleum Refining	25,790
30	Rubber Products	531
3111	Leather Tanning and Finishing	885
333,334	Metal Smelting and Refining	50,200
3471	Electroplating and Metal Finishing	3,462
355,357	Special Machinery	5,062
367	Electronic Components	1,436
3691,3692	Storage and Primary Batteries	477
	Total:	222,214

* includes solvent reclamation operations and factory-applied coatings

** included pesticides and explosives

Furthermore, in order to assist industry in establishing hazardous waste treatment/disposal facilities, the Administration is prepared to:

- A. Act as a coordinator for the various DEP applications (SWA will offer industry direct assistance in determining whatever other permits are needed, and will coordinate the review activities);
- B. Obtain federal funding, to conduct a market survey;
- C. Consider offering various tax free bonds, assistance programs, and tax breaks by which the State can render financial aid in building and operating hazardous waste facilities;
- D. Use the Manifest System to put an end to the illegal dumping of hazardous and chemical wastes; and
- E. Continue its efforts to assure that New Jersey will have, in the long run, adequate facilities.

Recently, we have found it encouraging that three major national companies have indicated that they are ready to seek new facilities or expand their existing facilities in New Jersey. Clearly, significant progress has been made in this area.

It is important to note that there are currently 27 authorized facilities within New Jersey that can handle, process, store, treat, or dispose of various chemical wastes.

SHORT TERM STRATEGY

The immediate problem is exceedingly complex, however, the Administration has implemented an assistance program that has had some success in dealing with industry's problems. This program:

1. Encourages waste output reductions via better housekeeping, liquid separations, sludge dewatering, etc;
2. Encourages and recommends recovery or recycling where possible, providing necessary information concerning commercial recovery operations;
3. Encourages on-site treatment, sewer discharge for liquid waste where permissible, and on-site storage as viable alternatives;
4. Renders technical assistance to industries regarding identification and classification of waste streams (certain wastes or dewatered sludges are nonhazardous and amenable to landfilling), alternative treatment/disposal facility listing and selection assistance, and waste exchange information (several New Jersey firms now use the State Chamber of Commerce Exchange operating out of Newark);

5. Provides direct assistance to industry by contacting waste brokerage firms, in-state processing facilities, and out-of-state treatment facilities, as well as sister-state environmental agencies concerning disposal of specific waste streams;
6. Approves various experimental projects in land farming of waste sludges, involving assessment of the ability of soil microorganisms to degrade these wastes and environmental impacts of such disposal methods; and
7. Sponsors meetings with various industrial groups (e.g. Chemical Industry Council, NJ Business and Industry Assoc., Chamber of Commerce).

CONCLUSION

The Solid Waste Administration is pursuing an aggressive management program for hazardous waste disposal in New Jersey. We are, I believe, proceeding with a rationally-developed plan to regulate and control disposal, and equally important, to provide industry with alternate disposal sites. In fact, this latter question of siting is, and will continue to be, a critical issue within any hazardous waste management system. It is a question that demands careful technical evaluation to assure the highest degree of environmental and public protection, with strong state-level control over zoning. A reasonable balance must be struck, however, when considering siting questions. One unalterable fact remains--industry generates "hazardous waste" -- and, in simple terms, such wastes must go somewhere. They won't disappear if ignored, they won't vanish from indifference, or apathy, or legislation.

The time has come to attack this ubiquitous and potentially devastating problem; we can ill-afford to wait any longer. If a concerted effort on all levels is not made, we will be drowning in our own wastes in the near future. The Love Canal incident in New York alarmingly illustrates this.

The mandates are clear, the decisions complex, and the outcomes uncertain, but we in the business of Environmental Protection must act and ACT NOW!

References

- P.L. 94-580, "The Resource Conservation and Recovery Act of 1976"
- N.J.S.A. 13:1E-1 et seq. - New Jersey Solid Waste Management Act (as amended).
- N.J.A.C. 7:26-1 et seq. Rules of the Bureau of Solid Waste Management (as amended).

A Case Study Overview

BUFFALO PRETREATMENT PROGRAM

Donald L. Menno
Sr. Industrial Waste Engineer
Buffalo Sewer Authority
City of Buffalo, New York

4

4

4

4

Introduction

In 1935 the Buffalo Sewer Authority (BSA) was established to convey and treat the sewage generated in the City of Buffalo. This year, following an April 1966 directive of the New York State Health Department, the Authority will commence operation of a 180 MGD advanced wastewater treatment facility.

Contrary to some people's feelings that "403" (General Pretreatment Regulations for New and Existing Sources of Pollution = 40 CFR Part 403) signaled the beginning of toxic waste control in municipal programs, the BSA, and I am sure this is the case with most other sewer agencies, has always been concerned about the discharge of deleterious materials to its sewerage system. To protect its then-new primary system, Buffalo's program started over forty years ago, with its first comprehensive survey of industrial wastes conducted by Greeley and Hansen Engineers. From its early concerns regarding pollutants associated with primary treatment, the Authority's industrial waste control interests have progressed to include the 65 priority pollutants, so recently cited in the National Resources Defense Council/EPA Consent Decree.

In 1972 the Authority realized that it had to expand the basic functions of its industrial waste program to meet the needs of a more delicate and sophisticated treatment system as well as to satisfy EPA requirements. The first of two contracts was entered into with the firm of McPhee, Smith, Rosenstein Engineers (formerly NTMA) to conduct a new wastewater survey of industrial and commercial establishments within the BSA's jurisdiction.

Phase I

The first phase of the Industrial Waste Survey (IWS) focused on the identification of contributing industries. Five primary sources were used to establish a preliminary list as shown below:

1. Existing Authority files,
2. State & city industrial directories,
3. Water Department records,
4. Tax records, and
5. Yellow Pages.

A total list of 1,466 commercial and industrial firms was obtained. By screening out dry or minor contributing industries, these were eventually short-listed to 631.

To obtain the information required to estimate the characteristics of waste discharged to the sewer system, a questionnaire was sent to every firm on the short list (Figure 1). This questionnaire is currently being used as a model at Pretreatment Seminars conducted by EPA Technology Transfer throughout the country. As questionnaires were returned, each firm was categorized using the U.S. Government Standard Industrial Classification Code (SIC). This system lends itself to easy computerization since each firm can be correlated to its wastewater discharge characteristics. With the information gathered in the first phase we were now ready to proceed with the second phase of the survey. It must be realized that the IWS was much more complex than is being presented here today. Information on the availability of the complete survey can be obtained by contacting either Mr. Gillman J. Laehy, General Manager of the BSA, or John Gorton of MSR Engineers.

Phase II

In May of 1973, Phase II of the survey was initiated. The six tasks identified in the Phase II scope of work were:

1. Location and identification of major industrial dischargers,
2. Location and identification of sewer ordinance violators,
3. Development of an updated ordinance to protect the new plant,
4. Industrial Pretreatment System recommendation,
5. Development of an equitable cost recovery system, and
6. Development of a data base for industrial waste surcharges.

The sampling and analysis portion of the program was carried out in four stages. The stages, plus a summary of the data gathered is shown in Table 1.

**BUFFALO SEWER AUTHORITY
INDUSTRIAL WASTE PERMIT APPLICATION
Sheet 1 of 3**

SIC # _____
 Map # _____
 Loc # _____
 S.D. E.C.S.D. #4
 (For BSA use only)

Company Name XYZ Company

Address 112 Park Lane, Lancaster, New York

Representative T. Smith Title Plant Engineer Phone No. 444-4444

Hours of operation/day 24 Days of operation/week 6

No. of employees. Shift No. 1 250 Shift No. 2 112 Shift No. 3 90

Type of Business (Manufacturer, Distributor or Retail) Manufacturer

RAW MATERIALS

AMOUNT PER YEAR

<u>Pig Iron</u>	<u>3,100 tons</u>
_____	_____
_____	_____

PRODUCTS

AMOUNT PER YEAR

<u>Ferrous Casting</u>	<u>2,500 Tons</u>
_____	_____
_____	_____

Type of Process - Continuous Batch _____

Industrial Wastes:

What waste products are disposed to: Sewer wastewater Other solids to dump

Is discharge to sewer. Intermittent _____ Steady

Quantity/day 400,000 Est or measured Est.

Are wastes pretreated? If so, which and how None

Plant Sewer Connections to B S A

	<u>Size & Shape</u>	<u>Material</u>	<u>Location in Plant</u>	<u>Connected To</u>
(1)	<u>8"</u>	<u>Clay</u>	<u>By Loading dock</u>	<u>Brown Street</u>
(2)	<u>12 or 15"</u>	<u>Iron</u>	<u>Southwest</u>	<u>Smith Street</u>
(3)	<u>12"</u>	<u>Iron</u>	<u>Southeast</u>	<u>Smith Street</u>

Are maps showing sewer connections available? yes

ADDITIONAL INFORMATION TO BE SUPPLIED ON YOUR LETTERHEAD.

ANNUAL VARIATION IN OPERATION

Is there a scheduled shut down? Yes When? Last two weeks in August

Is production seasonal? no

If so Period of full production _____ to _____

Period of limited production _____ to _____

Period of no production _____ to _____

Employees (No) Max 500 % of time at Max 20

Min 400 % of time at Min 20

If not Average No of employees 450

WATER USE

Source(s) of water Erie County Water Authority

If from an agency, Account # 0764398, 0764399, 0764350

Water used for

	gpd	Recirculated
Sanitary _____	gpd	
Air Conditioning _____	gpd	
Process water _____	gpd	
Jacketed cooling water _____	gpd	<u>100%</u>
Other _____		

Period of max water use Fairly steady Amount Unknown

Period of min water use _____ Amount Unknown

Water disposal other than sewer none % of total _____

Is water consumed in product? Off as steam Amount/day 10%

Type and number of air pollution devices 2 bag houses

Have the waste streams been previously analyzed? no

Are radioactive isotopies used in your process? no Specify _____

Table 1 Sampling and Analysis Program

<u>Task</u>	<u>Results</u>
1. In-Plant Investigations	- Number of Discharge Lines - Average: 2.3 Range: 1 to 7 - Accessibility for sampling & flow measuring - 70% Y connections - Location & number of water sources - city water, river & wells
2. Scheduling of Industries	- By location using map atlas
3. Sampling & Analysis	- 600 Samples - 30% Flow Proportional - 70% time composite - Average of 3.1 Samples/Industry - 45% of Industries analyzed for heavy metals
4. Reporting	- Characterized plant operation - Documented survey - Recommendations for cost recovery and ordinance violations

The format used to provide the Authority with the information gathered during this phase is presented in Figure 2.

Development of New Sewer Use Ordinance

The third step in Phase II was the expansion of the BSA's Sewer Ordinance to better serve present day needs in Industrial Water Pollution Control. I will not discuss the complete ordinance, but try to highlight the important changes. I would like to also mention here that after approval by EPA officials, it has been used as a model in the Region.

RECOMMENDATION
APPENDIX "A"Company

XYZ Company
112 Park Lane
Lancaster, New York

SIC No. 3325
Map Loc. 67-24
Sample Points 3
Production Hrs. 24
Compositing Hrs. 24

Surcharge

Primary - Test results indicated that when E.C.S.D. #4 becomes tributary to the Buffalo system, XYZ Company should pay an industrial waste surcharge for excess suspended solids.

Secondary - When the new treatment plant goes on stream, no additional surcharges should be added unless the character of XYZ's waste changes.

Ordinance Violations

During the sampling program, the waste from XYZ's sample point #1 was in violation of the sewer ordinance's grease and oil provisions. In addition, concentrations of lead and phenols were measured at higher than acceptable levels.

Water Balance

Allowance - None

Discharge - 450,000 gpd

Cooling
& - 414,000 gpd
Process

Sanitary - 36,000 gpd

Special Requirements

Pretreatment - Before entrance into the Buffalo system is permitted, XYZ Company must pretreat its waste to eliminate the above ordinance violations.

Control Manholes - We recommend that XYZ provide control manholes on their discharges equipped with continuous monitoring equipment to pro-

vide composite samples and flow measurements.

Monitoring - We recommend that XYZ self-monitor its waste discharge and report to the B.S.A. quarterly. After E.C.S.D. #4 becomes tributary to the Buffalo System, B.S.A. should monitor XYZ's discharge on an annual basis.

Remarks - All recommendations made herein, should be held in abeyance until such time as E.C.S.D. #4 enters the B.S.A. system.

The first section to undergo major changes was Article II. This section sets forth the "General Provisions" for the ordinance. Three sections which were radically changed are:

- Article II, Section 3
Area affected now includes all areas of the City of Buffalo and outside sewer districts who are, by contracts or agreements with the Buffalo Sewer Authority, tenants of the Authority's treatment works.
- Article II, Section 5
"Penalty for Violations and Civil Liability" spells out our specific penalties for violators of the ordinance.
- Article II, Sections 8 - 14
Explains the new policies with regard to the control of industrial waste, including the issuing of permits to industrial users as well as pretreatment requirements and the levying of surcharges for treatment of high strength waste.

Article IV, Section 8, was a new section which added new classes of permits for construction. This was done to ensure that the Authority is made aware of all new sources of industrial waste.

Another article which underwent major changes was Article V. This deals with the general use of sewers and sets forth the following requirements.

Section 1 Industrial Wastewater Discharges Prohibited
- Requires a permit to discharge

Section 5 Prohibited Discharges
- Flammable or explosive liquid, solid or gas
- Waters for the purpose of diluting wastes to meet concentration limits
- pH lower than 5.5 or higher than 9.5

In addition, Section 6 of Article V established the limited discharge criteria as shown in Table 2.

Table 2 Limited Discharges

<u>Parameter</u>	<u>Concentration mg/l</u>
Grease & Oil	100
Chromium (Total)	5.0
Chromium (Hexavalent)	0.4
Copper	5.0
Nickel	4.0
Zinc	5.0
Cadmium	1.0
Silver	1.0
Mercury	0.1
Phenols	8.0
Cyanide (Total)	1.6
Cyanide (Amenable)	0.4

Article VI of the ordinance deals specifically with industrial wastewaters. Although the ordinance was written prior to the federal Pretreatment Regulations, this section is the meat of our program and covers all of the essential 403 control elements. The highlights of this section:

- Require permits & set conditions
- Establish procedures for permit change, suspension & revocation
- Establish conditions for civil liability
- Require, where applicable, the payment of a surcharge
- Require monitoring & monitoring points

As mentioned earlier, the length of this presentation does now allow us to delve too deeply into any one subject. If you would contact our office we would be happy to send any available material or to try to answer any questions you may have.

Implementation and Enforcement

With the comprehensive data base developed from the results of the survey and the development of an updated sewer ordinance, the Authority was ready to implement its new program.

One of the first steps was staffing the new Industrial Waste Section. Our present table of organization is shown in Figure 3.

Recognizing the impact that this new program would have on the industrial community, the Authority, along with local industrial representatives, proceeded to form the "Buffalo Area Advisory Council on Industrial Wastewater" in January, 1977.

The current membership is:

Republic Steel	Buffalo Color Corporation
Buffalo General Hospital	Mobil Oil Corporation
Anaconda-American Brass	Keystone Corporation
Dual Printing Inc.	Modern Linen Supply
Nabisco	

The purpose of the Advisory Council is three-fold:

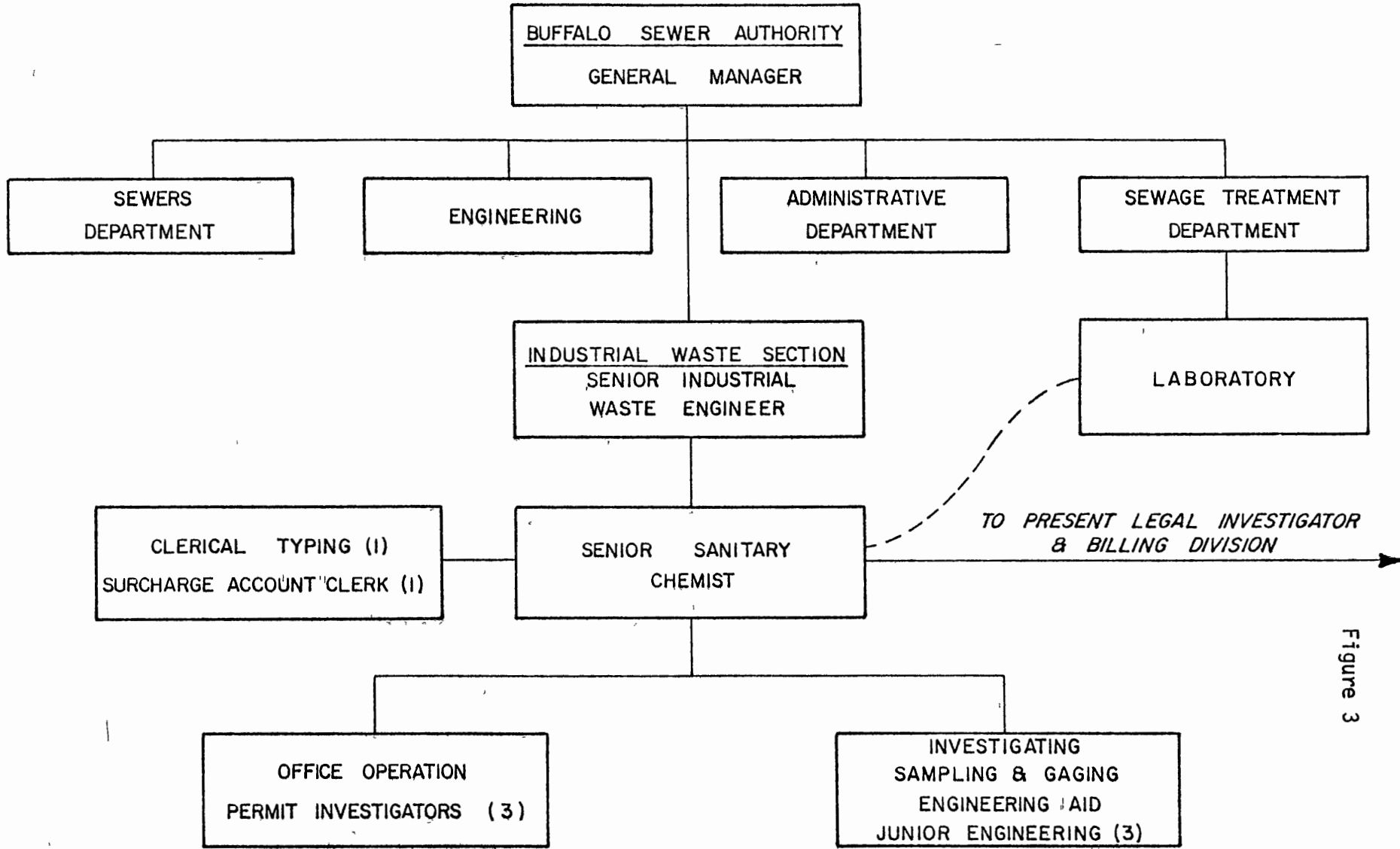
- To review the economic impact compliance will have on industrial users;
- To keep industry abreast of all new state and federal regulations;
- To lobby for change in the present state and federal regulations where inequities seem to exist.

Acting collectively, the Authority is hopeful that the Council will be able to sufficiently influence both state and federal agencies to amend overly stringent regulations which might otherwise prove to be too great a burden to the economy of Buffalo and Western New York. During its short span of existence the Council has had considerable success in the pursuance of its goals. Three examples which illustrate that industry can have an effective voice in its own regulation follow.

- The Council noticed differences between certain numerical discharge limits in the Buffalo ordinance and other areas of the country. The Council, in concert with the BSA, approached New York State and was able to gain approval for an increase in allowable limits.

ORGANIZATION CHART

B.S.A. — INDUSTRIAL WASTE SECTION



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Figure 3

- New York State currently reimburses the BSA for 25% of its O&M costs. Until recently income from industrial surcharges was deducted from total O&M costs prior to computation of allowable grant aid. With prodding from the Council and the BSA, state officials have agreed to include these costs as a reimbursable item. The result will be rebates to industry on that portion of their surcharges which are reimbursed under the O&M aid program.
- A final and most illustrative example of the Council's effectiveness is the recent commencement of the only site-specific economic impact study of water pollution control regulations to be undertaken by EPA. Acting with the Authority and Congressman Henry Nowak, the united effort will hopefully identify adverse economic impacts, if any, and attempt to propose alternative, cost-effective solutions.

Permit System

Utilizing the conclusion of the Industrial Waste Survey that a permit system coupled with a strong, enforceable sewer use ordinance would be the most practical approach for the control of industrial wastes, the Authority proceeded to develop its Buffalo Pollutant Discharge Elimination System (BPDES) permit. As you will note, our permit (Figure 4) is essentially a plagiarized NPDES permit which we have found encompasses all sections of the Act pertaining to industrial discharges.

It is the Authority's contention that public relations accounts for at least 50% of any successful industrial water pollution control enforcement program. The Authority promotes good public relations through personal contact with industrial representatives. This is exemplified by the method we use to issue a BPDES permit. The procedure utilized for issuance of a permit can be broken down into four stages:

1. Initial Visit
 - explain program
 - request questionnaire
2. Review of Questionnaire
 - determine applicability of industrial waste program
 - where applicable, request specific parameters to be analyzed
 - follow up visit by permit investigator

FIGURE 4

AUTHORIZATION TO DISCHARGE

UNDER THE BUFFALO POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33U.S.C. 1251 et; the "Act") PL 84-660, and the Sewer Regulations of the Buffalo Sewer Authority,

is authorized to discharge from a facility located at

to the Buffalo Municipal Sewer System in accordance with discharge limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight,

By authority of Gillman J. Laehy, P.E., General Manager

Signed this _____ day of _____.

CONDITION

A.1. DISCHARGE MONITORING REQUIREMENTS

During the period beginning _____ and lasting through _____,
the permittee is authorized to discharge from outfall(s) serial number(s).

See attached map.

Such discharges shall be monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC
Sample Point Parameter

REPORTED
CHARACTERISTIC
(mg/l except pH)

MONITORING REQUIREMENTS
Sample Period Sample Type

Measuring
Frequency

CONDITION

A.2. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning _____ and lasting through _____,
the permittee is authorized to discharge from outfall(s) serial number(s).

See attached map.

Such discharge shall be more limited and monitored by the permittee as specified
below:

<u>SAMPLE POINT</u>	<u>PARAMETER</u>	<u>DISCHARGE LIMITATIONS</u> DAILY MAX (mg/l except pH)	<u>MONITORING REQUIREMENTS</u> SAMPLE PERIOD SAMPLE TYPE	<u>MEASURING</u> <u>FREQUENCY</u>
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CONDITION

A.3. PRETREATMENT STANDARDS AND MONITORING REQUIREMENTS FOR CFR 40 PART 413 -
ELECTROPLATING POINT SOURCE CATEGORY

During the period beginning July 12, 1980 and lasting through _____
the permittee is authorized to discharge from outfall(s) serial number(s)

See attached map

Such discharge shall be limited and monitored by the permittee as specified
below

<u>SAMPLE POINT</u>	<u>PARAMETER</u>	<u>PRETREATMENT STANDARDS</u>		<u>MONITORING REQUIREMENTS</u>		<u>MEASURING FREQUENCY</u>
		Maximum for any one day	Average of daily values 30 consecutive days shall not exceed	SAMPLE POINT	SAMPLE TYPE	
	Under 40,000 gal./Day					
	CN,A	0.20	0.08	Three 24hr. days	Comp.	Semiannual
	Over 40,000 gal./Day					
	pH	within the range 7.5 to 10		Three 24hr. days	Comp.	Semiannual
	CN,A	0.20	0.08			
	CN,T	0.64	0.24			
	HEX,CR	0.25	0.09			

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the discharge limitations specified in Condition A2. for: _____

A Schedule of Compliance must be submitted within three months of the commencement date of this permit. This schedule shall include the following: (1) The date of beginning of construction of the Industrial Pretreatment Facility. (2) The date of completion of construction of that facility. (3) The date the facility will achieve operational levels and provide the levels of treatment required to comply with the effluent limits as specified in A-2 of this permit. (4) Proof of capability of physical flow measurement of sample point(s)

Upon review of scheduled pretreatment facilities, the schedule will be attached and become a part of this permit.

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next schedule requirement.

All reports, plans and/or specifications that propose new or modified waste treatment and/or disposal facilities must be approved, and signed and sealed by a professional engineer licensed to practice in the State in which the facilities are to be built.

C. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required shall be representative of the volume and nature of the monitored discharge and shall follow the B.S.A. sampling and analytical guideline.

2. Reporting

Monitoring results shall be summarized and reported on the days stated in Conditions A1, A2 and/or A3, at the following address:

Gillman J. Laehy, P.E. General Manager
Buffalo Sewer Authority
1038 City Hall
Buffalo New York 14202

Attention: Industrial Waste Section

3. Review of Analysis
 - by sanitary chemist & engineer
 - develop draft permit for firms surchargeable or in violation
 - permit delivered & explained by investigator
4. Mailing of Final Permit

Implementation of 403

The BSA proposed to develop an approved program in conformance with 40 CFR 403 and 40 CFR 35.907. Both the BSA and the industrial Advisory Council realize the benefits of an approved program and are working together to accomplish this.

By having an approved program the Authority will have the primary enforcement responsibility in its service area. It is our belief that equitable and fair regulation best comes from a level where personal knowledge of existing needs and problems exists rather than from far-removed regulatory agencies.

Secondly, only by having an approved program can the Authority pass on credits for the incidental removal of incompatible pollutants at the treatment plant. In this way, firms only slightly out-of-compliance with categorical pretreatment standards may not have to expend large amounts of money for expensive equipment.

Finally, in recognition of the fact that industrial leaders cannot be expected to be regulatory experts, an approved program will allow us to be better able to pass on timely information to industry on new regulations, available variances, and impending compliance dates.

On February 15th this year, the Authority met with officials of the EPA and New York State DED in an attempt to gain approval for a local pretreatment program as soon as possible. In this manner we feel the pretreatment standards can be enforced by the Authority, which has a better understanding of the local conditions.

In conclusion I would like to say that, as is probably realized by now, the objective of the Clean Water Act "to restore and maintain the chemical, physical and biological integrity of the nations waters" is very complex and tremendous in scope. With industrial relations being one of the most tender subjects in the northeast, any industrial waste program must be implemented in an efficient, careful and cooperative manner. Our goal must be environmentally sound regulation, while maintaining economic integrity, without compromising the health of our society.

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