

In spite of the difficulties encountered with some industrial wastes, the outlook for pollution abatement is good. Industries are developing a fuller realization of the evils of stream pollution and have assumed a co-operative attitude. In some cases, research is in progress, although more research is needed. At the moment, twenty-five municipal projects are in the process of development, and if Work Projects Administration or a comparable form of federal assistance remains, most of them will go under construction in 1940. The completion of these proposed projects will provide treatment for the sewage produced by 220,000 people, thereby raising the percentage of domestic sewage receiving adequate treatment to 84. There will undoubtedly be a recession in the rate of progress in the municipal field if federal monetary assistance is withdrawn. Even if it continues, it is doubtful if the 1939 construction record will ever be exceeded. However, if a reasonable amount of federal funds is made available for loans and grants-in-aid, the future progress in pollution abatement should be comparable to that since 1933. At such a rate, Indiana's pollution problem as we now recognize it should be practically eliminated in seven to ten years.

Acknowledgment is given to John W. Kirkpatrick, Assistant Engineer, Indiana State Board of Health, for many valuable suggestions, the compilation of data, and the preparation of the charts and drawings used in this paper.

CONTROL OF STREAM POLLUTION AS APPLIED TO THE CITY OF PERU, INDIANA

Harrold E. Norris,
Superintendent of Streets,
Peru, Indiana

Peru's problem of stream pollution results primarily from domestic sewage. Industrial waste pollution at Peru does not create much of a problem.

Peru is the county seat of Miami County. It is a fourth-class city, with a population of 13,000. Peru is a typical river city with the Wabash River running through it for a distance of approximately two and one-half miles. The city extends back from the river six to twelve blocks on either side. The Wabash River in this vicinity has an average width of some 200 feet, with a flow channel sufficient to prevent the problem of stream pollution from being as great as in some other sections of the state where larger cities empty their sewage into much smaller streams. The fact that the river runs lengthwise through the approximate center of Peru has tended to promote its use, in the past, as an interceptor sewer, because every other street extending back at right angles to the river carries a main sewer that empties directly into the river.

This discharge of the city's raw sewage has created a very objectionable stench and filthy condition in the summer months, during low stages of the river, especially noticeable to those living close to the river. The resultant pollution has been destructive of fish life and prohibitive of healthful enjoyment by the citizens of Peru and vicinity of the recreation and sports provided by unpolluted streams of like size.

PLANS FOR SEWAGE DISPOSAL

Plans were first proposed in the early twenties for the construction of an interceptor sewer as a part of a flood-control plan for the Peru Flood Control District. This plan intended only to decrease the pollution of the river, within the city limits, by carrying all sewage to the down-stream end of the city before discharging it into the river. If this plan had been carried out, the pollution problem, as far as cost was concerned, would have been lessened in later years when it became necessary to collect the city's sewage for treatment. However, this part of the flood-control plan was not adopted because of the prohibitive cost, and instead tide gates were installed on each sewer to prevent high water from backing up into the sewer system.

The first steps toward the elimination of stream pollution due to sewage were taken in 1935, after the establishment of the Federal Public Works Administration. An application was submitted to that department for funds, on a loan-and-grant basis, with which to construct a complete system of sewage treatment. Our application was not caused by any mandate of the State Department of Commerce and Industry, but because the city officials of Peru and most citizens were desirous of eliminating the city's portion of pollution to the Wabash River as had been recommended to them by the Bureau of Sanitary Engineering of the State Board of Health. This application was accepted by the federal government, and an offer was made to the City of Peru on June 28, 1938. Upon recommendations of the State Board of Health, the government offer was accepted by the city, it being called to the city's attention by the state board that in the near future it would become necessary for them to mandate the city to cease polluting the river with sewage and that at such time a government grant might not be available.

A consulting engineer was employed by the city, and final plans and specifications were prepared for the construction of new interceptor sewers and a complete sewage treatment plant with secondary treatment of the activated sludge type. The plans that were first prepared and submitted to the State Board of Health for approval contemplated the treatment plant's being located on the north side of the river at the west end of the city, with sewage being pumped from the center of the city through a force main to the plant.

At the suggestion of the Bureau of Sanitary Engineering of the State Board of Health, the location of the plant was changed to the south side of the river and nearer the center of the city, thereby greatly reducing the length of force main. Although it was necessary to buy land for a new location, it was shown that the savings in cost by using a shorter force main, with the resultant savings in pumping costs over a period of years, would be much greater than that caused by the additional expenditure necessitated by the purchase of the required land. Our new treatment plant is now nearing completion, and the city is more pleased with the revised location than it would have been had it been constructed as originally contemplated.

Construction of the interceptor sewer system started on September 26, 1938, and work on the treatment plant in March, 1939. All of the sewer work and the pumping stations are completed, and the treatment plant will be completed in a few days.

COSTS

The total cost of the plant and interceptor sewer will be approximately \$431,000. Of this amount approximately \$150,000 has been spent on sewer construction, and the balance on the construction of the treatment plant and pumping stations. Forty-five per cent of the total cost was financed by a grant from the United States Government, and the remaining fifty-five per cent by the sale of revenue bonds. This method of financing is in accordance with the special statute adopted by the Indiana State Legislature in 1932, which provides for the financing and construction of sewage treatment plants by the revenue-bond method.

As previously stated, the treatment plant is of the activated sludge type. It has a design capacity for a population of 18,000 and an additional 4,000 population equivalent has been added for industrial loads, making a total design basis of 22,000. The type of aeration in the secondary treatment is of the type most commonly known as "fixed-plate diffusers."

The gas obtained from the sludge digestion process is used to operate a gas engine that drives one of the air blowers. Use of part of the gas for heating the digestion tanks is also contemplated. The method of sludge disposal is that of drying beds, two of these having glass covers.

All plans and specifications have been prepared and construction has been supervised by the engineering firm of Chas. W. Cole, of South Bend. Special credit is also due Mr. Onis M. Leonard, of Mr. Cole's firm, and Mr. Chas. Feters, resident engineer during construction. Special credit is also due the Indiana State Department of Health, which has been very helpful in making recommendations on various phases of the work.

The pumping equipment and the interceptor sewer system were placed in operation on January 1 of this year. The plant is only partly in use at this time.

This plant has several very unusual features and is just a little different, so I am told, from any other plant in the state. On behalf of the City of Peru I want to extend to each and every one of you an invitation to visit our plant at any time that it is convenient for you to do so.

CCC DRAINAGE CO-OPERATION

A. T. Fahl,
Huntington County Surveyor,
Huntington, Indiana

Huntington County has received excellent co-operation from the CCC Drainage Camp D-2, Fort Wayne, Indiana. The camp now serves territory within a radius of twenty miles from the camp site, so that only the northeastern portion of Huntington County can obtain this CCC work in the future. This camp is serving seven counties in northern Indiana; therefore, it cannot do all that is asked of it in each county. We have always had co-operative superintendents in this camp, of which we are justly proud. In the past years they made several clean-outs in open public ditches, but no tile repairs. They have constructed concrete headwalls in Huntington County to the fullest satisfaction of the landowners and me. The CCC workmen and supervisors have done splendid hand labor and tractor operations in open ditch clean-outs and dredge work.

They have given dynamite demonstrations for open ditch clean-outs in our county with good results, yet I deem it inadvisable to use dynamite in the winter months, as the explosion propagation goes under the frozen banks instead of upward, and breaks out beyond the banks in the fields, leaving large crevices that loosen the banks, causing them to sluff off into the ditch. I would suggest a summer demonstration to determine what can be done with dynamite ditching under favorable conditions.

At present we have a project up for government approval in Washington for clearing and dredging the Little Wabash River, which we hope will be acted upon soon. This camp cleared approximately 15 miles of this river in 1938 in Allen County with splendid results.

Too much time spent in transporting the boys to and from the project site during the daily six-hour working period is the reason given for the mileage reduction. We feel that the