

N O T E S

on the

PORTLAND SEWAGE DISPOSAL PROJECT

May 1933 - June 26, 1936

Ormond R. Bean

There has been much discussion relative to the cleaning up of the Willamette River - arguments for, arguments against, criticism of procedure, condemnation of action taken and commendation of attempted solution of the problem, until the people of Portland are bewildered with misinformation and lack of understanding of the problem as it exists, as well as lack of knowledge of the present status of the proposed sewage disposal system which has had so much publicity during the last few years. A review of the facts to bring the situation up to date might be of interest to those who have been disappointed because action has not been taken, or those who have apprehensions as to the advisability of any action being taken.

There are distinctly different opinions upon the entire question. There are those who are for a clean river; those who believe that the river does not need any cleaning; those who believe that any payment by the people for the construction of a disposal system would be rank extravagance; and those who believe that the city will be forced sooner or later to take proper steps to eliminate the pollution of the Willamette River and the Columbia Slough.

If anyone doubts the existence of the last group, just discuss the matter with those who have manufacturing plants on the Columbia Slough, and hear what they have to say and what they are now planning to do.

For many years there has been a band of faithful men and women who have foreseen the necessity of eliminating the sewage from the streams of Oregon. This group has never missed an opportunity to advance the cause of anti-pollution of streams, and when you know that there are forty-eight sewers emptying into the Willamette River within the city boundary, and eleven sewers emptying into the Columbia Slough, you must appreciate that pollution exists in these two streams.

During the spring of 1933, when the depression was at its height and the cry for emergency work was heard throughout the land, this same group saw an opportunity to proceed on a worthwhile construction project. They started agitation to awaken the city to the need for such work and to call attention to the opportunity then before them to obtain federal funds from the R.F.C.

This group attached to itself a young man by the name of Walter Baer, who had studied engineering but who had never prepared himself to act as an engineer by applying under the State License Laws for an engineering license. Mr. Baer aligned himself with the unemployed and became very active as a leader in promoting a sewage disposal work project.

In May, 1933, he, together with his group, appeared before the City Council requesting funds with which the project could be developed. The Council was advised by Mr. O. Laurgaard, the then city engineer, that a proper sewage disposal system would cost approximately \$20,000,000.00, and the Council felt that any such project was out of the question. Later Mr. Baer and his group persuaded the Council and the Emergency Relief Committee to allow some of the Emergency Relief Fund money to be used to employ draftsmen to prepare plans and specifications in accordance with a legislative enabling act, passed by the Oregon Legislature in 1933 - Chapter 289 - which permitted the City of Portland to issue self-liquidating bonds, payable from a service charge, when approved by the voters based upon "proper" plans and specifications.

Mr. Baer and nineteen men as relief workers worked approximately six weeks making surveys and preparing plans, estimates and specifications, and on June 8, 1933 a proposed sewage disposal system was submitted to the Council and approved by it. A special election was called for July 21, 1933 to pass on the



issuance of \$6,000,000.00 self-liquidating bonds based upon the plans, estimates and specifications submitted to the Council on June 8, 1933.

During the preparation of these plans, the City Engineer had little or no interest in the project. Mr. Baer was in full charge, but on July 1, 1933, Mayor Carson and myself took office and I immediately asked for a report on the development of the plans under Mr. Baer's supervision. I found that the plans were principally a detailed drawing of an activated sludge treatment plant with a map of Portland containing red pencil lines which were to represent intercepting sewers. No actual estimates of flow of sewers or size of sewers, or cost of construction had been made. No study of other than activated sludge (a patented process with high royalty cost) type of treatment had been made.

Storey, Thorndike, Palmer & Dodge, bond attorneys of Boston, commented on the Baer plans as follows:

"Those plans were very indefinite, presenting bare outlines of several alternative projects. The so-called general specifications were so brief and so general that they meant practically nothing. The report contained considerable detail as to a possible treatment plant but left open the question whether this plant or some other plant or several plants should be built, and where such plant or plants should be situated. It contained very little information as to the rest of the project. The estimates of costs were very brief and very general, and appear to have been based in part upon assumed costs for very substantial units of the project and give little evidence of careful and thorough consideration of the details of the work. Indeed, no such consideration would have been possible in the then very indefinite form of the proposed project. It does not seem to us that these are plans, specifications and estimates of cost of the kind required by the statute".

I found that a company making activated sludge equipment had submitted to Mr. Baer certain plans for an activated sludge plant, and that he had attempted to adapt these plans to the Portland situation.

This was during the first week of July, and one of the first ordinances I introduced in the Council was an ordinance which was passed July 5, 1933 stating that the plans, estimates and specifications for the sewage system, as approved

by the Council June 8th, were tentative only and would have to be changed, revised and added to as further study developed the need. I then asked City Engineer Laurgaard to take the so-called Baer plans and whip them into proper shape so that before the election July 21st they would be more nearly what could be built. These partially revised plans and estimates were filed with the Council July 12th as a possible sewage disposal system.

Mr. Baer, the anti-pollution group and newspapers, together with the unemployed, put on a fine campaign for the passage of the bond: The emergency character of the times, as well as the intense campaign resulted in the passage of the bonds by a vote of 47,029 to 23,395.

During the campaign there were claims that the sale of fertilizer from the sludge would pay for the plant. This was denied by other in the campaign but the belief that "Self-Liquidating" meant "Self-Liquidating by Sale of Fertilizer" remained in the many minds as the reason for voting for the bonds.

After the approval of the bonds by the voters, the question of how to proceed was before the Council. That question was referred to me for recommendation.

The problem of sewage disposal is one involving many phases of engineering and economics. It is not as simple as some seem to think. It would be simple to build a system for complete treatment if there were no limitation in construction or maintenance costs.

As soon as the bonds were approved suggestions began to come in. One suggestion was a 24" to 30" intercepting sewer system constructed of wood with sewage pumped under high pressure to treatment plants. This system would no doubt be of low first cost but the maintenance for pumping and replacement of a sewer under such pressure would be enormous and prohibitive, and was, of course,



given little consideration.

The question of how much treatment was necessary, the location of treatment plants, the size of intercepting sewers, the number of pumping stations, whether all sewage and storm water should be intercepted and treated, whether storm water should overflow into the river, whether wood, brick or concrete sewers should be used, how best to intercept all the sewers when their existing levels were so different, whether the cost of producing fertilizer was justified by the income from sale of same, whether to burn or bury sludge, whether to give primary, secondary or complete treatment, whether to tunnel or open ditch, whether right of way costs justify relocation of the interceptors - these, with many other questions were the important basis on which a system of disposal should be predicated.

The then City Engineer Laurgaard was not sympathetic toward any sewage disposal system, and as I considered the problem one of great responsibility, I recommended to the Council that a consulting board of three local engineers be set up to make a report on conditions and assist in preparing for the election and later in the preparation of an application to be presented to the P.W.A. for a loan of \$6,000,000.00 and a grant of \$2,000,000.00.

At the time the sewage disposal project was first contemplated, the federal regulations in regard to loans, etc. stated that self-liquidating projects were required to pay interest and principle from other than tax monies. No tax monies could be used. Therefore, the original council action was based upon that principle and the bonds were so voted.

Soon after the election the regulations were changed and tax monies not only could be used but a proper security was necessary, and the only security the City of Portland has is through a general obligation bond which requires the vote of the people and cannot be established by the City Council.

The State R.F.C. Board had employed Messrs. Koon, Cunningham and Dieck as engineers to report on the Willamette river condition, and I therefore recommended to the Council that the same group act as consultants for the city. This recommendation was accepted by the Council and Messrs. Koon, Cunningham and Dieck prepared a report, which was filed with the Council July 19, 1933, concerning the river in Portland. They also assisted in making application to the P.W.A.

The first application was filed upon the basis of sketch plans prepared prior to the election, and known as the "Baer Plans", together with some little information added by the Board of Consultants and the City Engineer's office. This application was filed August 4, 1933 and was for a grant of \$2,000,000.00 and a loan of \$6,000,000.00 on the self-liquidating bonds voted by the people on July 21, 1933. The application was returned immediately to the city by the P.W.A. Engineers with the statement that the plans, estimates and specifications were insufficient to afford a proper checking of the application, and that more complete plans would have to be furnished before the application would receive consideration. The P.W.A. Engineers suggested that it might take \$40,000.00 to \$50,000.00 to prepare proper plans, etc., and that it might be possible that the P.W.A. would advance the necessary money to prepare the application.

The Council authorized the application to P.W.A. for \$25,000.00, to be used in preparing the proper application. This request was submitted to P.W.A. on August 13, 1933, and was refused on the grounds that P.W.A. was not advancing money for preparation of applications.

The City Council in September 1933 authorizing the placing of \$10,000.00 of bonds then held by the Municipal Paving Plant in excess of their working capital in the hands of the State R.F.C. Committee, in return for which the State R.F.C. Committee would advance up to \$15,000.00 for preparation of plans, estimates and specifications for the disposal system.



During the early stages of the development of the application to the P.W.A. there were many proposals made in regard to engineering on the project. One proposal which involved Mr. Baer and has been referred to many times, was a proposal made by Mr. Baer associated with a local engineer and a California engineer with wide experience in the activated sludge type of disposal. This proposal was made on the basis of a fee of 3% of the total cost of the project which was then estimated at \$6,000,000.00 or \$180,000.00 fee. They proposed to prepare the application to the P.W.A., and if accepted to do all engineering work for the 3% fee; the contract to be a contingent contract with 3% fee if project proceeded and no payment if project was not accepted by P.W.A.

This proposal was turned down by the Council as it was believed proper that the city engineering department should prepare the actual plans, etc., and no contract of the type offered would be good business for the city.

Later, when another demand was made to allow the preparation of the application on the above contingent basis, the California engineer when asked how much money he or his associated were prepared to spend on the preparation of the application replied that the extreme maximum would be \$6,000.00, and that he did not intend to do more than outline the scheme. This statement, taken together with the P.W.A. engineer's statement that plans complete enough to make careful estimates would be necessary, showed the fallacy of the contingent offer.

The question of engineering and the economies of design was of such great importance that I recommended to the Council that we should have as an advisor an engineer who had been making this type of designing his life work, and who would give the city advice as to the broad principles of a proper system for our city, and that the actual engineering design be carried out in the office of the city engineer under the advisory supervision of a small group of local engineers who would act as a consultant board. The City Council on October 19, 1933 adopted my recommendations.



I consulted with local engineers, with Mr. Baer, and with the Technical Council and selected a group of seven nationally known engineers for consideration. These were corresponded with and after much deliberation Harrison P. Eddy of Metcalf and Eddy, Boston, was selected as consultant on a per diem basis, with total fee not to exceed \$5,000.00. His services have cost \$3,047.70, the balance of the \$5,000.00 being saved. Mr. Eddy has for many years been considered one of the great authorities on sewage disposal in the United States, having been engineer or consultant on over a billion dollars worth of such projects. He was also on the P.W.A. Advisory Board, which is the court of last resort in regard to engineering matters concerning P.W.A.

The engineers, Koon, Cunningham and Dieck who had made the report on the Willamette river and the Portland situation were retained by the Council on October 25, 1933 (Ordinance No. 65039, amended by Ordinance No. 65067, November 2, 1933) and were to be paid \$1,000.00 each when the proper application was prepared, and an additional \$1,000.00 each if the project was accepted and was permitted to proceed. They have been paid the first \$1,000.00 but have not received the contingent balance.

Mr. Eddy was employed September 15, 1933 and immediately came to Portland and spent a week or more in Portland making an intensified study of the local condition. He spent considerable time on the river, going over each river bank for the entire length with the city. He studied the sludge banks in the river, the pollution of the Columbia Slough, the maximum and minimum flow of the Willamette and Columbia rivers, the population trends, the condition of sewers, the materials through which the intercepting sewers would extend, the crossing of the river, the necessity of pumping stations, the location of treatment plants, etc. I have never in my engineering experience seen a more intensive

study of a problem in the short time available. No phase of the situation was overlooked or rushed in the determination of the basis of his report. His report, dated October 3, 1933, recommended that intercepting sewers be built on each bank of the Willamette river, that crossings be made where deemed proper, and that pumping lift stations be installed with gravity flow between such stations to avoid excessive depth of a complete gravity system, that an intercepting sewer be built along the Columbia Slough, that storm water overflow into the Willamette river and Columbia slough at termini of the trunk sewers, that a main intercepting sewer be continued to the banks of the Columbia Channel, and that a primary treatment removing approximately 70% of the solids be installed at that point, and the solids burned or buried, and that the effluent be emptied into the Columbia Channel where the dilution would exceed twenty-five times that required by the United States Health Department, and that provision be made so that if and when necessary further treatment could be installed without material changes in the primary treatment.

Mr. Eddy reported that any treatment beyond primary treatment would be considered foolish extravagance and that he was sure the federal government would not approve of such expenditure of money.

He also recommended against the manufacture of fertilizer from the accumulated sludge. He states that he knew of no place where the sale of fertilizer showed a profit over the investment and maintenance cost of the necessary plant to produce fertilizer. This statement was substantiated by written statements from Milwaukee and Pasadena plants where fertilizer is sold.



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SEWERAGE COMMISSION - CITY OF MILWAUKEE

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December 17, 1934.

Honorable Joseph K. Carson, Jr.,  
Mayor, City of Portland,  
Oregon.

I regret that I have not been able before this to write you concerning the conversation had with you at Chicago during the recent convention of mayors held there.

As I remember your questions, they relate to the possibility of treating sewage and selling sufficient fertilizer from the sludge produced thereby to defray the cost of the construction of the facilities required and the operation of same.

Our experience in Milwaukee has been that we are able by the manufacture of fertilizer from the sludge produced by the activated sludge method to receive therefrom sufficient revenue to defray the cost of making such fertilizer and the sale of same. In other words it can be said that the manufacture of fertilizer approximately defrays the cost of the disposal of sludge. This refers only to operating cost. It does not refer to original cost or the interest upon the original cost. This is based upon a price of approximately \$15.00 per ton of fertilizer produced f.o.b. plant. Naturally, if in your location you would receive less than this amount or more, then the picture would be different. I doubt that under any circumstances you could expect to receive from the fertilizer produced from a sewage disposal plant enough revenue to defray both construction and operating cost.

Where the sale of fertilizer produced from a sewage disposal plant is of sufficient amount to defray the cost of the disposal of sludge, I would consider this method a desirable way to dispose of your sludge. But to do so requires a lot of special machinery, a careful and experienced personnel to operate same and a highly developed sales outlet.

It might be of interest to you to know that the cost of our disposal plant as a whole amounts to approximately \$9,000,000.00 of which \$3,500,000.00 is developed solely for the disposal of sludge.

If this letter does not answer the questions you have in mind or if it does not touch upon the subject matter you had in mind, I would be glad to answer anything that I am able to upon your request.

Hon. Joseph K. Carson

12/17/34

I wish to express the pleasure I had in meeting you in Chicago, and hope some day to see you again.

Very truly yours,

Jas. L. Ferebee,

Chief Engineer

JLF/LB