Review Of Waste Water Discharges Of Sugar And Potato Plants At Easton, Maine B-165456

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

JUNE 22, 1971

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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Dear Senator Muskie:

This report is in response to your request of March 18, 1970, that we determine the extent to which waste water discharges to the Prestile Stream have been the result of the operations of a sugar plant at Easton, Maine. We have been requested also to determine the current status of the control of waste water at the sugar plant and at a potato-processing plant which is located adjacent to the sugar plant.

Although our review showed that operations of the sugar plant resulted in waste water discharges to the Prestile Stream, the information obtained was not sufficient to permit our determining the extent to which such discharges occurred. We were able, however, to determine that substantial improvements had been made after 1968 in controlling and reducing waste water discharges to the Prestile Stream.

The more significant matters disclosed by our review are discussed below.

BACKGROUND

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The sugar plant is leased by Maine Sugar Industries, Incorporated, from the Aroostook Development Corporation, and the potato plant is leased by Vahlsing, Incorporated, from the Easton Development Corporation. The potato plant began operations in 1961, by which time seven lagoons had been constructed to hold the waste water discharged as a result of the potato plant operations. The sugar plant began operations in 1967.

The Maine Environmental Improvement Commission in July 1961 issued a license to Vahlsing, Incorporated, which permitted waste water discharges to the Prestile Stream--a maximum discharge from potato operations of 480 gallons a minute, or about 700,000 gallons a day. The license recognized, however, that discharges to the Prestile Stream, on any given day, might exceed 700,000 gallons because of the use of a lagoon system for storing waste water and releasing such stored waste water during periods of high streamflow. One condition of the license required that facilities were to be provided for sampling and measuring the flow of the waste water discharges.

A November 1965 license granted to Maine Sugar Industries required that (1) facilities for measuring the flow of waste water be installed before the point where the waste water entered the lagoons owned by Vahlsing, Incorporated, and (2) facilities be provided for sampling the waste water from the sugar plant.

Prior to 1967 certain waste treatment facilities were built for the purpose of separating the solids and oils discharged from the potato plant. One of the seven lagoons was set aside for holding the solids and another for holding the oils. A third lagoon was set aside to store fresh water for fire protection. As of January 1967, therefore, four of the original seven potato lagoons were being used to hold waste water and were interconnected so as to equalize the waste water levels. In addition, two lagoons or pits were constructed in 1966 to hold the mudlike wastes discharged from certain sugar plant operations.

CHRONOLOGY OF EVENTS

Documentation showing the dates that a number of changes and additions to the waste water control facilities occurred was not available. Nor were aerial photographs available showing the changes which occurred at the complex between 1967 and 1970. Because neither documentation nor photographs were available and because the sugar plant was not operating at the time of our review, we relied heavily on discussions with employees of the potato and sugar plants in obtaining information on waste water control facilities and practices at the complex. Considerable information was obtained from two persons primarily responsible for the waste water facilities--the plant engineer and the chief chemist.

Production information

Once the sugar plant starts production, it operates continuously until the campaign ends--barring unusual disruption. The potato plant, on the other hand, normally shuts down on weekends. In 1967, 1968, and 1969, the potato plant operated

246 days, 241 days, and 234 days, respectively. In the same years the sugar plant operated 92 days, 93 days, and 107 days, respectively.

January 1967 to mid-1968

The first sugar beet campaign was started in January 1967. In no case were we able to obtain documentation which showed the volume of waste water flowing from the sugar plant, notwithstanding the provision in the license granted by the Maine Environmental Improvement Commission which required the installation of facilities for measuring waste water discharges. Our review did show, however, that reuse of water in the sugar operation substantially reduced the quantity of waste water that otherwise would have flowed to the sugar and potato lagoon systems. Waste water from two of the four main sugar operations flowed to the potato lagoons, and waste water from the other two operations was pumped to the sugar lagoons.

During a 22-day period in May 1967 and a 21-day period in June 1967, an engineering firm measured the volume of waste water being discharged from the potato lagoon system to the Prestile Stream and found the volume to be about 2 million gallons a day. According to the engineering firm's report and a Vahlsing, Incorporated, official, this flow was equivalent to the volume of waste water being discharged from the potato plant to the lagoon system. The company official also advised us that the discharge of 2 million gallons a day from the potato plant to the lagoon system was representative of the daily discharge during periods when the plant was operating.

The engineering firm also estimated the capacity of the four potato lagoons to be about 18 million gallons. Since about 2 million gallons of waste water a day were being discharged to the lagoons, the lagoons would have filled in 9 days if no discharges to the Prestile Stream had been made. Therefore, because of the limited waste water holding capacity of the lagoons, it was necessary to release the waste water to the Prestile Stream. According to employees of Vahlsing, Incorporated, the discharge of large quantities of waste water to the Prestile Stream was fairly constant until mid-1968.

In addition to the normal flows of waste water and the discharges to the Prestile Stream previously described, a heavy rainfall on November 24, 1967, when both sugar and potato plants were operating, swelled the lagoons and threatened the contamination of the complex's freshwater supply. A ditch was cut in a potato lagoon wall to permit a greater flow to the Prestile Stream. Shortly thereafter, the newest and largest of the three sugar lagoons began overflowing, the impoundment gave way, and the contents of the lagoons flowed into the Prestile Stream and the complex's water supply. This accident forced the sugar and potato plants to shut down for several days.

Mid-1968 to June 1970

The waste water holding capacity of the complex remained essentially the same until the summer of 1968. The discharge of waste water from the operations at the complex in July 1968--a point in time when the flow of water in the Prestile Stream was low--resulted in extremely polluted conditions in the stream. This situation prompted the construction of significant additions to increase the waste water holding capacity of the complex during the summer and fall of 1968. Two new lagoons were added adjacent to the existing potato lagoons. But the most significant addition by far was the creation of a huge impoundment north of the plants--named Lake Josephine--which dwarfed the total capacity of the other holding facilities of the complex. (See pp. 7 to 9 for a discussion of the current holding capacity of Lake Josephine.)

The recorded cost of the Lake Josephine Dam, about $324,000, was charged to Maine Sugar Industries. Other improvements included heightening the impoundments around the sugar lagoons and constructing a canal and a pump house to pump waste water from the complex to Lake Josephine. The potato lagoons were interconnected so that any discharging to the Prestile Stream or pumping to Lake Josephine caused the level of the waste water in the lagoons to fall simultaneously.

Employees of Vahlsing, Incorporated, stated that, because of the greatly increased capacity for holding waste water,

discharges to the Prestile Stream were stopped in mid-1968 and did not resume until about February 1969. From February 1969 until May 1970, the practices concerning discharges to the Prestile Stream were as follows:

1. A continuous small discharge was maintained.

2. During periods of high streamflow caused by rainfall or snow runoff, which usually occurred in spring and fall, substantial releases were made until the streamflow was observed to be lowering.

3. During periods of low streamflow in the winter and summer, the discharges were substantially reduced.

In 1968 provision was made to divert waste water to a sugar lagoon from one of the two sugar operations previously discharging waste water to the potato lagoon system. Provision was made also for overflow from the sugar lagoons to combine with potato waste water at the Lake Josephine canal. Rain or snow runoffs from the area of the sugar plant, for the most part, flowed to this same canal.

In the fall of 1969, the height of Lake Josephine was increased, providing greater holding capacity. In December 1969, during an attempt to start up a second pump at the Lake Josephine pump house, both pumps were short-circuited, and it took 6 days to repair them. For these 6 days, the potato lagoon system was opened to release waste water to the Prestile Stream and fresh water was released to the stream from the freshwater impoundment to reduce the adverse effect that the waste water would have on the quality of the water in the Prestile Stream.

During our visits in April, May, and June 1970, we observed that (1) a sugar lagoon was overflowing and combining with waste water from the potato lagoons, (2) a continuous small discharge was occurring from the potato lagoons to the Prestile Stream, (3) rain or snow runoff was carrying lime and mud residue from the sugar operations to the Lake Josephine canal, and (4) the level of waste water in the potato lagoon

system had dropped noticeably between our visits on April 16 and April 27. Upon inquiry, we were told that a heavy rainfall occurred during this time and that, for about 4 hours one evening, the potato lagoon discharge pipes were opened wide and waste water was discharged to the Prestile Stream. This action appeared consistent with the stated discharge practices of the complex. (See p. 5.)

DISCUSSION WITH MR. FREDERICK VAHLSING, JR.

On October 8, 1970, we met with Mr. Frederick Vahlsing, Jr., president of Vahlsing, Incorporated, and Maine Sugar Industries. Although Mr. Vahlsing agreed that flows of waste water from sugar operations occurred essentially in the manner as described above, he took the position that flows of waste water from the sugar plant were minor. He stated that a large amount of the water used in the sugar operations was recirculated or evaporated into the atmosphere and was not discharged as waste water. We could not determine actual flows because measuring devices had not been installed in accordance with the conditions of the licenses and because we were unable to evaluate the factor of evaporation. A consulting engineering firm's report dated February 1970, however, estimated the flow of waste water from sugar operations at about 2,000 gallons a minute.

Mr. Vahlsing stated that previous practices meant little now because:

1. He had instructed his staff at the complex to make no more discharges to the Prestile Stream except during spring runoff.

2. Subject to 1 above, all waste water from sugar and potato operations was to be held in the present lagoon system (including Lake Josephine).

3. The contents of Lake Josephine would be used to irrigate crop fields during summer months, as was done successfully during the summer of 1970.

On October 29, 1970, we visited the complex and confirmed that the waste water level in Lake Josephine had been substantially reduced from what it was in June 1970. We observed, however, a small discharge from the potato lagoon to the Prestile Stream. We asked the Maine Environmental Improvement Commission and Northern Maine Regional Planning Commission whether there had been any complaints concerning the irrigation practices of Vahlsing, Incorporated, during the summer of 1970 and received a negative reply.

Mr. Vahlsing stated that, at most, 340 million gallons of waste water could be expected from a good sugar beet campaign (120 days) and about 510 million gallons from a potato campaign (235 days) making a total of about 850 million gallons each year. He contended, however, that about 30 percent of this waste water would be lost through evaporation and seepage into the ground. Mr. Vahlsing stated also that Lake Josephine would hold about 1.3 billion gallons. Therefore, according to Mr. Vahlsing, there is no present or future waste water problem at the sugar and potato plants at Easton.

In light of Mr. Vahlsing's statements, the problem concerning pollution of the Prestile Stream appears to be resolved. However, the resolving of this problem is predicated upon the following conditions.

1. That no discharges will be made to the Prestile Stream which will violate the stream's classification.

2. That Lake Josephine is able to hold the waste water resulting from sugar and potato operations each year that cannot be discharged to the Prestile Stream under the condition set forth in 1 above.

3. That irrigation practices during the summer months will be effective.

4. That, in the event the capacity of Lake Josephine is not sufficient to hold the waste water, such capacity is increased.

The capacity and structural soundness of Lake Josephine are considered extremely important. An engineering firm using topographical maps estimated the capacity of Lake Josephine at about 500 million gallons. Mr. Vahlsing advised us that the engineering firm had not considered increases in the height of the impoundment at Lake Josephine made subsequent to the engineering firm's visits to the site. The engineering firm advised us that its estimate was no longer valid in view of Mr. Vahlsing's statement that the capacity of Lake Josephine had been increased.

On October 20, 1970, we asked for and received an estimate of the holding capacity of Lake Josephine from the Corps of Engineers. The Corps of Engineers in preparing its estimate also used topographical maps and photographs plus information we had obtained in June 1970 from employees of Vahlsing, Incorporated, as to the height of the impoundment. This information took into consideration the increase in the height of the impoundment at Lake Josephine. The Corps estimated the holding capacity of Lake Josephine at about 500 million gallons.

In view of the wide variation in the estimates and the importance of this factor, we asked Mr. Vahlsing if he would make available to us whatever survey data he had to support his estimate of 1.3 billion gallons. He stated that no current survey data existed and that he had prepared his estimate by using a car speedometer and other data in estimating the average depth of Lake Josephine.

To resolve the differences in the estimated capacity of Lake Josephine, we requested the Corps of Engineers to send a survey team to Easton, to develop as good an estimate as possible within the time limits established. The survey was to be made during the week beginning November 30, 1970. On November 25 your office advised us that Mr. Vahlsing had agreed that the topographic survey of Lake Josephine was a good idea. On November 27, however, Mr. Vahlsing advised us that he wanted to accompany the survey team when it was at Easton and that he could not arrange his schedule to enable him to be at Easton

during the week of November 30. The survey was therefore postponed. Mr. Vahlsing later advised us that he could be at Easton during the week beginning January 11, 1971.

On December 8, 1970, we called the Chief, Engineering Division, New England Division, Corps of Engineers, to obtain his views on performing a topographic survey of Lake Josephine during the week beginning January 11, 1971. He stated that the heavy snow cover would probably cause the survey measurements to be inaccurate. He stated also that the snow cover would make access to areas around the lake extremely difficult and that he would prefer to have the survey performed when the climatic conditions were more suitable.

We advised your office in December 1970 that we were finalizing the results of our review and would make no further request of the Corps of Engineers to perform a topographical survey.

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We believe that a significant effort was made, beginning in mid-1968, to bring the sugar and potato plants' waste water discharges to the Prestile Stream under control. Improvements were made at the complex to substantially control discharges of waste water from the plants to the Prestile Stream. This control was not possible with the facilities existing before mid-1968.

Failure to install measuring devices to record the volumes of waste water leaving the sugar operations and entering the potato lagoon system, as well as the failure to measure the discharges to the Prestile Stream, makes it impossible to determine the actual volume of waste water discharged or to determine the extent that sugar operations have contributed to discharges to the Prestile Stream in the past.

In regard to the control of waste water from future operations at the sugar and potato plants, much depends upon the capability of Lake Josephine to hold the waste water from