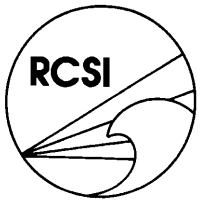

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Cost of Removing Radiostrontium from Milk

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COST OF REMOVING RADIOSTRONTIUM FROM MILK

It was stated in an article appearing in Nuclear Information last year[1] that the cost of removing the bulk of the bone-seeking radioactive elements (and cesium 137) from milk is estimated at less than one cent a quart. This appears to be an unrealistically optimistic estimate; the cost of the necessary chemicals alone is about 3/4¢ per quart of milk processed, and to this must be added the costs of labor and plant depreciation. A more reasonable estimate of the cost of removing these radioactive elements from milk is about 2¢ per quart; the basis for this estimate is outlined below.

The following calculation of the cost of removing radiostrontium from milk is based on figures given in an article by Edmondson, et al.[2] Edmondson and his coworkers have been quite active in this field[3,4]. The following quote is taken from reference 2.

"Research with this pilot plant (my emphasis) indicates that the process could be adopted commercially in the event that radiostrontium in milk should reach dangerous levels. However, study of engineering problems and further research to establish the most economical procedure are needed before the fluid milk supply of the United States could be treated expeditiously, if such treatment should ever become necessary. This report is not intended to encourage premature entrance into this technical field by the dairy industry; it is presented only as an interim report to acquaint the dairy industry with the present status of the research...

"The process is based on the ion exchange principle... The cost of materials used for this process is primarily that of the salts used to regenerate the (ion exchange) columns after they become exhausted... The cost of these salts, plus that of the citric acid and potassium hydroxide used to adjust and then restore the milk's normal pH (acidity) is estimated at about 3/4¢ per quart of milk processed."

The description these authors give of the operation of the pilot plant indicates that it would probably be necessary to have two men working essentially full time on each shift. The pilot plant processes about 100 gallons of milk an hour. Thus, a pilot plant operating 7 days a week 52 weeks of the year would process about 880,000 gallons of milk per year. If the plant runs 3 shifts per day, with 2 men per shift, six men would be required; if salaries and associated overhead are $7,000 per man per year, the cost of labor is $42,000 per year. The cost of chemicals at 3/4¢ per quart comes to $26,400 per year. If we assume that the cost of the plant (including what may be needed in the way of additional building) is $20,000 and that this is amortized over a ten yea r period, the plant amortization comes to $2000 per yea r. Thus the total cost of processing 880,000 gallons of milk comes to $70,400. This amounts to about 2¢ per quart.

REFERENCES

1. Nuclear Information, March-April, 1963, page 7
2. Edmondson, et al, J. Dairy Science, Vol. XLV, No. 6, p 800 (1962)
3. -----, ibid, Vol. XLVI, No. 3, p 181 (1963)
4. -----, ibid, Vol. XLVI, No 11, p 1207 (1963)

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