

CONFIDENTIAL

MEMORANDUM

To WAC - c.c. File
From RJMcL
Subject Soluble Arsenic Survey

Date June 30/67
Ref. RJMcL/nh

A study has been made of Baker Creek and the Yellowknife River with respect to Arsenic content.

The Engineering Dept. measured the flow and sampled the water at the following points, on 15 June 1967.

	<u>Flow Cu. Ft/Sec.</u>	<u>Arsenic p.p.m.</u>
1. Baker Creek, 1,000 ft. upstream of Bow Lake	39.35	0.123
2. Overflow from Tailings dam to Baker Creek	0.665	16.84
3. Concentrate Wash Thickener Overflow	0.465	0.450
4. Mine drainage water	0.555	6.43
6. Baker Creek at "A" Boiler House	37.80	0.765
8. Bow Lake overflow to Yellowknife River	1.100	78.08
8a. Bow Lake to Yellowknife River, leak in dam	0.035	74.02
9. Yellowknife River at highway bridge	5,800.00	.011
7. Mill waste to Tailings Pond, averaged 1 Jan - 31 May 1967	1.90	51.50

The Flow balance at Bow Lake is as follows:-

Flow into Bow Lake #7	=	1.90 cu. ft. per sec.
Flow out of Bow Lake, #2	=	0.665 " " " "
#8	=	1.800 " " " "
#8a	=	<u>0.035</u> " " " "
Total	=	1.700 " " " "
Difference	=	0.200 " " " "

The Arsenic Balance for Bow Lake is as follows:-

<u>Soluble Arsenic to Bow Lake, #7</u>	=	563 lbs. As per day
<u>Arsenic out of Bow Lake, #2</u>	=	60.28 lbs. As per day
#6	=	467.28 " " " "
#8a	=	13.01 " " " "
Total		<u>541.47</u> " " " "
Difference		21.53 " " " "

The Flow Balance for Baker Creek is as follows:-

<u>In to Baker Creek</u>	#1	=	36.350 cu. ft. per sec.
	#2	=	0.665 " " " "
	#3	=	0.466 " " " "
	#4	=	0.585 " " " "
Total			<u>38.035</u> " " " "
<u>Out of Baker Creek</u>	#6		<u>37.800</u> " " " "
Difference			<u>0.235</u> " " " "

The Arsenic Balance for Baker Creek is as follows:-

<u>In to Baker Creek</u>	#1	=	24.105 lbs. As per day
	#2	=	60.276 " " " "
	#3	=	1.128 " " " "
	#4	=	19.240 " " " "
Total			<u>104.749</u>
<u>Out of Baker Creek</u>	#6	=	<u>155.295</u> " " " "
Difference			<u>50.546</u> " " " "

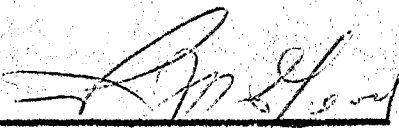
COMMENTS

A sample of the Yellowknife River was taken at the Highway Bridge which assayed 0.011 ppm. With the flow rate as calculated in the report by Mr. J. W. Grange, M.S. Public Health Division, dated December 23, 1963, of 3,800 cfs, this shows an inherent soluble arsenic content of 225 lbs. in the Yellowknife River. The inherent arsenic in Baker Creek is 24 lbs. of soluble arsenic per day. This is a total of 249 lbs. of soluble arsenic per day.

It appears that 25% of the arsenic in Baker Creek is inherent in the stream itself as shown by sample taken at #1, 1,600 feet upstream from the tailing pond.

A new method has been developed and put into service in the Mill whereby 67.3% of the soluble arsenic in the mill waste is precipitated in an insoluble form. The average pounds per day of arsenic in solution presently being pumped to Bow Lake is 184 lbs. This compares with 563 lbs. per day average for 1967 to May 31st inclusive.

RJMcL/nh


R. J. McLeod
Mill Superintendent