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MEMORANDUM

NOTE DE SERVICE

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P.A.

TO
À Dr. M.B. Wheatley,
Acting Coordinator,
Environmental Contaminant Program.

FROM
DE Dr. R.D.P. Eaton,
Consultant in Parasitology,
Northern Medical Research Unit.

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE - N/RÉFÉRENCE
YOUR FILE - V/RÉFÉRENCE
DATE January 24, 1977

SUBJECT
OBJET Further comments on the I.A.B. - U.S.W.A. "study".

Though the precise breakdown of study population and study results has still not been made available, the following points emerge from the material we have been given.

- (1) The population chosen is mixed, consisting of 46 native children and 20 Mine and Smelter workers. To combine these two groups in one makes for statistical nonsense, and was probably only done to boost the statistics for the native group. From the N.H.&W. survey published results these are the levels we would expect on such a mixed sample.
- (2) To do hair analyses on children is not an appropriate approach to a study of a known cumulative toxin. Although they are always the easiest study population, children were deliberately excluded from the N.H.&W. survey. Demonstrated hair levels in the children probably measure only surface contamination (compare males and females below 20 years in non-natives).
- (3) The choice of Whitehorse as a control group is probably inappropriate. A greenstone region without a gold or other smelter should have been selected, though in fact with the results obtained in the N.H.&W Study no such comparison is indicated as being necessary.

ACTION	PA	DATE
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INFORMATION		

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B.D.B. EAGON, B.P.D., M.B., CH.B.

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Further comments on the I.A.B. - U.S.M.A. study.

International Medical Research Unit
Consultant in Epidemiology
Dr. B.D.B. Eagon

Environmental Contamination Program
Action Coordinator
Dr. M.B. Hughes

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REMARKS	

MEMORANDUM

NOTE DE SERVICE

ANALYSIS OF HAIR ARSENIC RESULTS, YELLOWKNIFE, 1975

A total of 703 samples of hair were analyzed for arsenic on samples being collected in February, 1975. Of these, 350 were from non-native white males, 292 from non-native white females, 24 from native males and 37 from native females.

A breakdown of all results by age, sex and hair arsenic level is appended on the four accompanying tables.

Briefly it was found that 67% of non-native females had hair arsenic levels less than 1 p.p.m., a further 31% had levels between 1 p.p.m. and 4.9 p.p.m., 1.37% (4 total) had levels of between 5 and 9.9 p.p.m. and 0.34% (1 only) had a level greater than 10 p.p.m. This individual was a long time sufferer from psoriasis, and it appears probable that medication taken for the control of this ailment was the source of her arsenic. No other source could be found relative to work or residence.

In the non-native males much higher levels were encountered and a much greater proportion of the male population exhibited these high levels:

- 15.7% showed hair levels of less than 1 p.p.m.
- 53.14% showed levels between 1 and 4.9 p.p.m.
- 13.4% had levels between 5.0 p.p.m. and 9.9 p.p.m.
- whilst 17.7% had levels in excess of 10 p.p.m.
- Six of these were above 100 p.p.m., the highest individual reading being 443.2 p.p.m.

As far as could be determined all significantly high levels were found in employees of the Giant Yellowknife Mine, or in individuals who, though self employed, worked in the Mill complex.

Highest exposure risks were associated with the Roaster area and the Cottrell plant and Baghouse. High levels were also found in some laboratory workers but it is probable that their exposure came when collecting samples in other parts of the Mill rather than in the laboratory itself.

Amongst the ~~non~~-native males 16.67% had hair levels less than 1 p.p.m. (all above 20 years of age), 50% had levels between 1.0 and 4.9 p.p.m., 25% had levels between 5.0 and 9.9 p.p.m., and 8.3% (2 only) had levels above 10 p.p.m. (one of 10.2 and the other of 20.6) both being children.

Amongst native females 40.5% had levels below 1 p.p.m., 40.5% had levels between 1.0 and 4.9 p.p.m. and the remaining 19% had levels between 5.0 and 9.9. None had hair levels over 10 p.p.m.

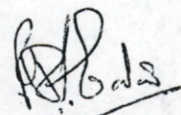
It is notable that in both native and non-native populations ^{< 20 yrs.} there is a variable relationship between age, sex and hair level which can best be explained by the traditional greater care over personal cleanliness and hair care exhibited by females above the age of puberty.

Amongst the group 1.0 p.p.m. and 4.9 p.p.m. the overall mean value is 1.95 with a standard deviation of 1.02. This calculation was based on all groups, male and female, native and non-native.

These results have also been plotted against residence, and against drinking water supply. No significant association could be shown in either case.

In summary the picture that emerges is one of an absence of general airborne or waterborne pollution - attested to by the generally low levels in the females, but a strongly positive correlation with sex and with place of employment, all really high levels being associated with the mill complex of the Giant Mine.

Moderately raised levels in native and non-native children are to be attributed to surface contamination by soil, occurring during play. The chances of serious intoxication by this route are viewed as remote in the extreme and all future effort should be confined to the internal mill environment. This is being done.


R.D.P. Eaton, Ph.D., M.B., Ch.B.

HAIR ARSENIC LEVELS IN 24 NATIVE MALES BY AGE GROUP
YELLOWKNIFE, FEBRUARY, 1975.

AGE PPM ARSENIC	0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70+	TOTAL
0.0-0.9	-	-	-	-	1	1	-	-	-	2	4 *
1.0-4.9	-	-	1	1	4	2	-	1	2	1	12
5.0-9.9	-	-	1	1	2	1	-	-	-	1	6
10.0+	-	1	1	-	-	-	-	-	-	-	2
TOTAL	-	1	3	2	7	4	-	1	2	4	24

* Includes 1 male Eskimo.

HAIR ARSENIC LEVELS IN 37 NATIVE FEMALES BY AGE GROUP
YELLOWKNIFE, FEBRUARY, 1975

AGE PPM ARSENIC	0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70+	TOTAL
0.0-0.9	-	-	1	3	9	2	-	-	-	-	* 15
1.0-4.9	-	1	1	2	3	1	3	1	3	-	15
5.0-9.9	-	1	2	2	-	-	1	1	-	-	7
10.0+	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-	2	4	7	12	3	4	2	3	-	37

* Includes 3 female Eskimo.

HAIR ARSENIC LEVELS IN 350 NON-NATIVE) MALES BY AGE GROUP

YELLOWKNIFE, FEBRUARY, 1975

AGE PPM ARSENIC	0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70+	UNKNOWN	TOTAL
0.0-0.9	1	1	3	12	14	11	5	4	1	2	1	55
1.0-4.9	2	13	24	18	35	24	34	19	11	2	4	186
5.0-9.9	-	3	4	2	8	9	11	6	1	1	2	47
10.0+	-	-	-	4	14	15	14	6	4	1	4	62
TOTAL	3	17	31	36	71	59	64	35	17	6	11	350

HAIR ARSENIC LEVELS IN 292 (NON-NATIVE) FEMALES BY AGE GROUP
YELLOWKNIFE, FEBRUARY, 1975

AGE PPM ARSENIC	0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70+	UNKNOWN	TOTAL
0.0-0.9	-	1	19	10	37	46	39	29	6	3	6	196
1.0-4.9	2	17	21	7	9	8	13	5	5	1	3	91
5.0-9.9	-	1	1	-	1	1	-	-	-	-	-	4
10.0+	-	-	-	-	1	-	-	-	-	-	-	1
TOTAL	2	19	41	17	48	55	52	34	11	4	9	292