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HASL-SC-1

HEALTH AND SAFETY LABORATORY  
ANALYTICAL BRANCH

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PRELIMINARY COOPERATIVE SUNSHINE REPORT

CLASSIFICATION CANCELLED

DATE 4/2-159

For The Atomic Energy Commission

*U.F. Can...*  
Chief, Declassification Branch *cc*

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October 26, 1954

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COOPERATIVE ANALYSIS PROGRAM

At the present there are three laboratories actively engaged in analyzing samples for the "SUNSHINE PROGRAM"; Lamont Geological Observatory, University of Chicago and the New York Health and Safety Laboratory. The U. S. Department of Agriculture Laboratories at Beltsville are preparing samples for the University of Chicago, and are running normal strontium analyses.

4 In order that the results reported from each <sup>of three</sup> laboratory <sup>is</sup> may be used to evaluate Sr<sup>90</sup> distribution, a cooperative program has been in operation since August of 1953. This preliminary report lists the results on samples received and distributed by HASL. It is hoped that complete results from all laboratories will be available soon.

The cooperative samples were run by the methods currently in use by each laboratory. At HASL, C<sub>2</sub> values were obtained by flame photometry for each sample. Sr<sup>90</sup> samples were standardized against NBS Sr<sup>90</sup>-Y<sup>90</sup> carried through the chemical procedure. (auth)

Cooperative Sample Results

1. Lamont Geological Observatory (Dr. J. Laurence Kulp) to HASL

(a) Cheese

Health and Safety No. 248; Lamont No. YC-8-( $\text{PO}_4$ )

phosphate form (Africa)

52.7 grams received as phosphate

$S_r^{90}$	$19.2 \pm 3.6$	d/m/sample
$C_a$	9.3	grams/sample
$S_r^{90}$	$2.1 \pm 0.4$	d/m/gram calcium
$S_r^{90}$	$0.96 \pm 0.2$	Sunshine units

Lamont result: None reported

(b) Bone

Health and Safety No. 249; Lamont No. YB-3-( $\text{PO}_4$ )

phosphate form (Lewiston, Montana)

6 month old calf slaughtered August 1953

30.4 grams received as phosphate

$S_r^{90}$	$41.6 \pm 3.9$	d/m/sample
$C_a$	9.25	grams/sample
$S_r^{90}$	$4.5 \pm 0.4$	d/m/gram calcium
$S_r^{90}$	$2.0 \pm 0.2$	Sunshine units

Lamont result:  $0.30 \pm 0.01$  Sunshine units

(c) Water and Snow

Health and Safety No. 250; Lamont No. YW-22-( $\text{CO}_2$ )

carbonate form collected April 1, 1954 at Lamont  
14.1 grams received as carbonate

$Sr^{90}$  4.3 ± 3.1 d/m/sample  
 $Sr^{90}$  - d/m/gallon\*  
Lamont result: 104 ± 3.3 d/m/gallon

\*Volume unknown

(d) Cheese

Health and Safety No. 251; Lamont No. YC-10d

original form (Africa-Casablanca)

20.3 grams of ash

$Sr^{90}$  9.5 ± 4.0 d/m/sample  
Ca 4.3 grams/sample  
 $Sr^{90}$  2.2 ± 0.9 d/m/gram calcium  
 $Sr^{90}$  1.0 ± 0.4 Sunshine units  
Lamont result: None reported

2. University of Chicago (Dr. Willard F. Libby) to HASL

(a) Milk

Health and Safety No. 287, Chicago No. 6

Solution form

Collected last fall from Premio Farm, Columbia Co.,

Wisconsin

$Sr^{90}$  6.4 ± 3.6 d/m/sample  
Ca 13.5 grams/sample  
 $Sr^{90}$  0.47 ± 0.27 d/m/gram calcium

(a) Milk (Continued)

$Sr^{90}$	$0.2 \pm 0.1$	Sunshine units
Chicago results:	$0.97 \pm 0.04$	Sunshine units

(b) Soil

Health and Safety No. 288; Chicago No. 6A

Solution form ( $NH_4Ac$  extraction)

collected in October 1953 from Premio Fama, Columbia Co., Wisconsin

$Sr^{90}$	$70.2 \pm 4.6$	d/m/sample
$C_a$	3.95	grams/sample
$Sr^{90}$	$17.8 \pm 1.2$	d/m/gram calcium
$Sr^{90}$	$8.1 \pm 0.5$	Sunshine units
Chicago result	$13.1 \pm 0.3$	Sunshine units

(c) Soil

Health and Safety No. 289; Chicago No. 6B

Solution form (extracted with HCl after  $NH_4Ac$  extraction)

collected in October 1953 from Premio Fama, Columbia Co., Wisconsin

$Sr^{90}$	$46.4 \pm 3.7$	d/m/sample
$C_a$	1.25	grams/sample
$Sr^{90}$	$37.1 \pm 3.0$	d/m/gram calcium
$Sr^{90}$	$17 \pm 1.4$	Sunshine units
Chicago result	$15.8 \pm 0.8$	Sunshine units

(d) Alfalfa

Health and Safety No. 290; Chicago No. 6

solution form

collected last fall from Premo Farm, Columbia Co.,

Wisconsin

$S_T^{90}$	$8.7 \pm 4.0$	d/m/sample
$C_a$	0.133	grams/sample
$S_T^{90}$	$65.4 \pm 30.1$	d/m/gram calcium
$S_T^{90}$	$30 \pm 14$	Sunshine units
Chicago result:	$4.26 \pm 0.15$	Sunshine units

(e) Alfalfa

Health and Safety No. 291; Chicago No. 6

phosphate form

95.4 grams received as phosphate

collected last fall from Premo Farm, Columbia Co.,

Wisconsin

$S_T^{90}$	$40.4 \pm 3.6$	d/m/sample
$C_a$	1b.0	grams/sample
$S_T^{90}$	$2.9 \pm 0.3$	d/m/gram calcium
$S_T^{90}$	$1.3 \pm 0.1$	Sunshine units
Chicago result:	None reported	

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3. HASL to Lasont Geological Observatory

(a) Milk

Health and Safety No. 247

powdered form

Perry, New York farm - processed May 10, 1954

$Sr^{90}$	$0.35 \pm 0.10$	d/m/gram of ash
$C_a$	0.20	grams/gram of ash
$Sr^{90}$	$0.6 \pm 0.05$	d/m/gram calcium
$Sr^{90}$	$0.3 \pm 0.03$	Sunshine units

(b) Bone

Health and Safety No. 170B

human - purchased skeleton

ground, not ashed

$Sr^{90}$	$0.2 \pm 0.1$	d/m/gram of ash
$C_a$	0.36	grams/gram of ash
$Sr^{90}$	$0.6 \pm 0.05$	d/m/gram of calcium
$Sr^{90}$	$0.3 \pm 0.03$	Sunshine units

(c) Bone

Health and Safety No. 132

Calf - Tifton, Georgia - slaughtered Fall 1953

ashed form

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Sr <sup>90</sup>	3.0 ± 0.4	d/m/gram of ash
Ca	0.30	grams/gram of ash
Sr <sup>90</sup>	8.4 ± 0.1	d/m/gram calcium
Sr <sup>90</sup>	3.8 ± 0.05	Sunshine units

4. Department of Agriculture, Beltsville, Maryland (Dr. Ronald G. Menzel) to HASL

Normal Strontium

Sample No. 1 - Grass

Weight of material	61.56 grams
Weight of ash	6.43 grams
Sample Lost	

Sample No. 2 - Grass

Weight of material	57.80 grams
Weight of ash	4.85 grams
ppm Sr	23.5
Grams Sr/sample	.00235
% Sr	0.048

Sample No. 3 - Milk

Weight of material	74.18 grams
Weight of ash	5.8 grams
ppm Sr	4.7
Grams Sr/sample	.00047
% Sr	0.008

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Sample No. 4 - Milk

Weight of material	61.15 grams
Weight of ash	4.76 grams
ppm Sr	3.1
Grams Sr/sample	.00031
% Sr	.007

Sample No. 5 - Bone

Weight of ash	
(as received)	21.40 grams
ppm Sr	47.0
Grams Sr/sample	.0047
% Sr	0.022

Sample No. 6 - Bone

Weight of ash	
(analysed)	25.00 grams
ppm Sr	37.6
Grams Sr/sample	.00752
% Sr	0.030

## CONCLUSIONS

1. The data from the cooperating laboratories were obtained from Dr. Libby's Project Sunshine Bulletin No. 9 and Dr. Kulp's Project Sunshine Annual Report of April 15, 1954. The completion of all analyses is required before conclusions are possible.
2. The reporting of  $\text{Sr}^{90}$  in terms of calcium requires analysis for calcium content of each sample. In addition, complete data on d/m/unit of sample must be available before valid comparisons can be made. The reporting of only Sunshine units does not give sufficient data for the purposes of of this cooperative program. Therefore, it is requested that all laboratories report d/m/sample, grams Ca per sample, and amount of sample taken. This will permit locating the source of any discrepancies.

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SUMMARY

<u>Sample</u>	<u>Chicago</u>	<u>Reported Results</u>	
		<u>Lamont</u>	<u>HASL</u>
1 a (Cheese)	-	N.R. <i>0.41±0.04</i>	0.96 S.U.
1 b (Bone)	-	<i>0.3±0.07</i>	2.0 S.U.
1 c (Water)	-	104.3 d/m/gal	4.3 d/m/sample
1 d (Cheese)	-	N.R. <i>0.35±0.10</i>	1.0 S.U.
2 a (Milk)	0.97 S.U.	-	0.2 S.U.
2 b (Soil)	13.1 S.U.	-	8.1 S.U.
2 c (Soil)	15.8 S.U.	-	17 S.U.
2 d (Alfalfa)	4.26 S.U.	-	30 S.U.
2 e (Alfalfa)	N.R.	-	1.3 S.U.
3 a (Milk)	-	N.R. <i>0.19±0.02</i>	0.3 S.U.
3(b)(Bone)	-	N.R.	0.3 S.U.
3(c)(Bone)	-	N.R. <i>2.3±0.17</i>	3.8 S.U.

**END**

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