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RONGELAP SURVEY, OCTOBER 1955  
RESULTS OF ANALYSES PERFORMED AT HASL

Laboratory Report 56-4

by

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PARTIAL DOCUMENT

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During November 1955, HASL received 12 soil, 12 seawater, 8 vegetation, 1 plankton, 2 algae, 6 fish, and 15 coconut samples collected by A. Seymour of the Applied Fisheries Laboratory, University of Washington. This particular set of samples was collected during October 21-23, 1955 on Rongelap, Kabelle, and Labaredj Islands of Rongelap Atoll and Mogiri Island of Alinginae Atoll.

Each sample was analyzed at HASL for total activity and Sr-90. Selected samples were analyzed for normal calcium by the oxalate-permanganate titration method, for reporting values in Sunshine Units. Values are reported as of February 27, 1956 and are presented in three sections:

1. A summary of HASL results including a comparison with data obtained from University of Washington Report No. UWFL-43.
2. A complete tabulation of HASL data with pertinent information given for each sample.
3. Notes covering sources of information, analytical procedures, and standardization and counting techniques used at HASL in processing these samples.

1. SUMMARY OF HASL DATA AND COMPARISON WITH AFL

SOIL

<u>Area Collected</u>	<u>Depth</u>	<u>Total Activity</u> d/m/g - wet		<u>Sr-90</u> d/m/g - wet	
		<u>HASL</u>	<u>AFL</u>	<u>HASL</u>	<u>AFL</u>
Kabelle	0-3"	6600-15000	16000-23000	200-510	N. R.
	3-6"	300- 620	420- 760	5- 23	N. R.
Labaredj	0-3"	5500- 7500	9600-25000	190-260	N. R.
	3-6"	360- 620	230- 550	5- 7	N. R.
Rongelap	0-3"	3000- 5700	3700-45000	190-210	N. R.
	3-6"	410- 1000	800- 1500	12- 32	N. R.

Total Activity

top 0-3", 6-25 times higher than 3-6" layer (HASL)

Sr-90

top 0-3", 7-50 times higher than 3-6" layer (HASL)

Average % Sr-90 in top soil - 3.9 (HASL)

Average % Sr-90 in bottom soil - 2.3 (HASL)

% Total Activity in top 3"

	<u>HASL</u>	<u>AFL</u>
Kabelle	96	97
Labaredj	96	97
Rongelap	88	89

NOTE:

Average Sr-90 found in continental United States soil top 0-2", 0.2 d/m/g (HASL)

SEAWATER

<u>Area Collected</u>	Total Activity d/m/liter		Sr-90 d/m/liter	
	<u>HASL</u>	<u>AFL</u>	<u>HASL</u>	<u>AFL</u>
Kabelle	650	300-500	undet.	N. R.
Labaredj	300	300-500	undet.	N. R.
Rongelap	undet.	undet.	undet.	N. R.
Mogiri	undet.	undet.	undet.	N. R.

ALGAE

Rongelap Island

<u>Location</u>	Total Activity d/m/g - wet		Sr-90 d/m/g - wet	
	<u>HASL</u>	<u>AFL</u>	<u>HASL</u>	<u>AFL</u>
Cistern	9410	8860-23600	undet.	N. R.
Well	680	570- 1880	~5	N. R.

PLANKTON

Kabelle-Rongelap

	Total Activity d/m/g - wet		Sr-90 d/m/g - wet	
	<u>HASL</u>	<u>AFL</u>	<u>HASL</u>	<u>AFL</u>
	44	99-418	undet.	N. R.

VEGETATION

Rongelap

	Total Activity d/m/g - wet		Sr-90 d/m/g - wet	
	<u>HASL</u>	<u>AFL</u>	<u>HASL</u>	<u>AFL</u>
<u>Papaya</u>				
pulp	58	17-137	0.4	N. R.
pulp and skin	100		1.0	N. R.
skin	>20		0.8	N. R.
seeds	64	37-503	>0.3	N. R.

Morinda

entire	34	14- 73	1.0	N. R.
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Arrowroot

corm	102	78-193	3.0	N. R.
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Squash

flowers and leaves	25	20-120	5.0	N. R.
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Pandanus

entire	84	76-189	2.0	N. R.
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Coconut

outer husk	80	N. R.	1.0	N. R.
inner shell	20	N. R.	0.2	N. R.
meat	} 40	23- 83	} 0.2	N. R.
milk		20-115		N. R.

% Sr-90

HASL	$\frac{1}{2}$ - 4% of total activity	} except coconuts
AFL	2 - 5% of total activity	

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COCONUTS - (HASL)

<u>Island</u>	Total Activity d/m/g - wet			Sr-90 d/m/g - wet		
	<u>Outer husk</u>	<u>Inner shell</u>	<u>Meat and milk</u>	<u>Outer husk</u>	<u>Inner shell</u>	<u>Meat and milk</u>
Kabelle	80	20	50	0.4	0.1	0.1
Rongelap	80	20	40	1.0	0.2	0.2
Labaredj	200	30	80	2.0	0.4	0.4

% Sr-90

Outer husk	~1%
Inner shell	~1%
Meat and milk	~0.1%

AFL - reports 0.1% in meat and milk

COMMERCIAL COCONUTS

<u>Total Activity</u>	Inner shell	2
	Meat and milk	5

FISH

		Total Activity d/m/g - wet		Sr-90 d/m/g - wet		
		<u>HASL</u>	<u>AFL</u>	<u>HASL</u>	<u>AFL</u>	
Kabelle	Tuna	bone	31	N. R.	~0.2	N. R.
		muscle	24	40	undet.	N. R.
		liver	186	1070	undet.	N. R.
Labaredj	Bonito	muscle	56	102	undet.	N. R.
		bone	227	N. R.	undet.	N. R.
Rongelap	Goatfish	muscle	21	18-37	undet.	N. R.

AFL - Sr-90 undetectable in marine organisms

2. COMPLETE HASL DATA

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3. NOTES

SOIL

1. Spec. No., Collection date, Area collected, Description, Depth, Backman readings - information supplied by A. Seymour.
2. Beckman readings in mr/hr taken 1" above ground - shield closed/shield open. Background - 0.05 mr/hr.
3. "Wet" refers to weight of soil as received at HASL.
4. "Dry" refers to soil aliquot dried at 100°C for eight hours.
5. Procedure:
  - a. Soil aliquot ashed at 550°C for 8 hours, then dissolved in HNO<sub>3</sub>. Solution aliquot plated directly on glass planchet for beta counting. Standardized against 0.2 gram K<sub>2</sub>CO<sub>3</sub>, mounted in similar manner.
  - b. Self-absorption correction applied in each case: based on self-absorption of activity in two top soils.
6. Sr-90 - suitable aliquot taken from solution of dissolved soil.
7. Error term associated with each result is one Poisson standard deviation.

SEAWATER

1. Spec. No., Area collected, Collection date - information supplied by A. Seymour.
2. All islands in Rongelap Atoll except Mogiri, which is part of Alinginae Atoll.
3. All water collections made in lagoons except Mogiri, where collection was made from anchorage.
4. The total activity result was obtained by precipitating carbonate from a 200 ml aliquot, mounting on 2" plastic disc and

TOP SECRET

beta counting under 2" tube.

- a. Standardized with K-40 (3 gms  $K_2CO_3$  mounted in similar manner) where 3 gms  $K_2CO_3 \equiv 2955$  d/m.
  - b. A self-absorption factor of 2 was applied to each result (See fig. 6 - Troll Report).
  - c. Assumptions:
    1. 18 month old pile produced f.p.'s simulate these conditions.
    2. Ca content of these waters and those sampled on Troll - constant.
5. Sr-90 analyses performed on 400 ml aliquot.
6. Error term associated with each result - one Poisson standard deviation.

#### VEGETATION

1. Spec. No., Organism, Tissue, Area collected, Remarks, - information supplied by A. Seymour.
2. "Wet" refers to wet weight given by A. Seymour, except in case of Pandanus, which was received in wet state at HASL.
3. Samples dried at 95°C by A. Seymour wherever a result is given, except for Algae, which were dried at HASL.
4. In all cases except Arrowroot, sample wet ashed at HASL.
5. Total activity results: based on direct plating of aliquot in glass planchet and beta counting. Standardized against 0.2 g  $K_2CO_3$ , mounted in similar manner.

Self-absorption correction factor applied in each case: based on self-absorption of activity in Papaya pulp and Cistern algae.

6. Aliquot taken for Sr-90: represented 10-20 gms wet material.
7. Error term associated with each result is one Poisson standard deviation.

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## COCONUTS

1. Spec. No., Area collected, Tissue, Remarks, - information supplied by A. Seymour.
2. "Wet" refers to weight as received at HASL. Samples were not dried but ashed at 550°C for 8 hours.
3. For total activity measurement a 0.2 gm aliquot of ash was beta counted in a plastic planchet and standardized against 0.2 gms K<sub>2</sub>CO<sub>3</sub>, similarly prepared.
4. No self-absorption correction applied.
5. Aliquot of dissolved ash analyzed for Sr-90.

## FISH

1. Spec. No., Organism, Tissue, Area collected, Collection date, Remarks - information supplied by A. Seymour.
2. "Wet" refers to wet weight given by A. Seymour.
3. Samples were dried at 95°C by A. Seymour except in case of Plankton, which was received in formalin.
4. In all cases except bone, sample was wet ashed at HASL. Bone was ashed at 550°C then dissolved.
5. For total activity - aliquot plated on glass planchet and beta counted. Standardized against 0.2 gms K<sub>2</sub>CO<sub>3</sub> mounted in similar manner. Self-absorption correction factor applied in each case: based on self-absorption of activity in tuna muscle and bonito bone.
6. Aliquot taken for Sr-90: represented 10-20 gms wet material.

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