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In reply please refer to: RSSD-80-026

30 January 1980   410700

Mr. Tom McCraw
Office of Health and
Environmental Research
Mail Stop E-201
United States Department of Energy
Washington, D.C. 20545

Dear Tommy:

Enclosed are the data summary tables for Bikini, Rongelap and Rongerik Atolls which we discussed last week. The data given represent average values rather than maximum levels which were given in previous summaries. Values are given for the total terrestrial exposure rate as well as the individual contributions due to ^{137}Cs and ^{60}Co. Average values were obtained by numerically averaging the individual second-by-second data points obtained over a given island. Islands lying close together were treated as a single island. In using the aerial data, it is important to remember that each one second data point represents an average value over an area several thousand times greater than the area which would be measured with an instrument placed at one meter. For very small islands, the aerial data will indicate a lower value than that measured from the ground, since part of the area being measured lies over water. Data obtained over larger islands, however, should agree in general with that measured on the ground. For Rongelap and Rongerik, exposure rate values are only given for those islands large enough to provide reasonable agreement between airborne and ground based measurements.

Cesium and cobalt exposure rate values were obtained from photopeak count rate data. Procedures used to extract the photopeak counts and obtain exposure rate values were similar to those presented in NVO-140 for the 1972 Enewetak aerial survey. The total terrestrial exposure rate values were obtained from gross count data after subtracting a water background. Subtracting the water background removes contributions to the spectrum from internal sources within the aircraft and from cosmic rays, resulting in a net count due to terrestrial activity. It can be seen that the sum of the ^{137}Cs and ^{60}Co contributions, on the average, agree quite well with that obtained from the total gross counts. This supports previous data which indicates that there is little or no naturally occurring terrestrial radioactivity within these coral atolls. For some of the atolls surveyed, the terrestrial activity levels were too low to determine the individual contributions due to ^{137}Cs or ^{60}Co using the photopeak extraction technique. Exposure rate values in these cases can only be obtained from the total gross counts.

In addition to Bikini, Rongelap and Rongerik, average terrestrial exposure rate levels were also determined for Ujelang and Utirik Atolls. For both of these atolls, the levels observed were essentially constant over the entire atoll. The gross count data gave an average exposure rate of 0.15 µR/h at Ujelang and 0.6 µR/h at Uterik. The primary source of activity at Uterik was due to ^{137}Cs. Levels were too low on Ujelang to positively identify any specific isotopes.

In order to obtain the total external exposure rate, it is necessary to include cosmic ray contributions. A value of 3.3 µR/h has been assumed for this component. Where comparisions can be made, the resulting total external exposure rate values from the aerial survey agree quite well with those measured during 1976 and 1977 by Brookhaven National Laboratory using a pressurized ion chamber (BNL 50797).

The island numbering system and the Marshallese island names were based on rather old atoll maps. The island names in some cases may reflect the influences of the Japanese. If you have any information on updated Marshallese spelling, please let me know.

I hope to complete this type of analysis for the remaining atolls within the next few weeks. Please let me know if there is any atoll in particular where this data might prove useful to you for your mid-February meeting.

Sincerely,

EG&G, Inc.

W. John Tipton
Section Head IV

WJT:es

Enclosures

cc: J. Deal   DOE/HQ
      J. Doyle EG&G
      R. Ray   DOE/NV
      W. Robison LLL

Northern Marshall Islands

Aerial Radiation Survey

Preliminary Data Summary

Bikini Atoll

Island Number	Frame Number	Marshallese Name	Total Gross Count	Average Terrestrial Exposure Rate * (μ R/h at 1 meter) ^{137}Cs Component	^{60}Co Component
B-1	177	Namu	32	21	9.4
B-2	38	Yurochi			
B-3	38	Uorikku	11.6	4.7	7.4
B-4	38	Romurikku			
B-5	38	Aomoen			
B-6	15	Bikini	35	31	1.9
B-7	7	Bokonfuaku	0.9	0.4	0.6
B-8	7	Yomyaran	1.6	0.9	0.5
B-9	7	Eniairo	7.2	5.5	0.9
B-10	7	Rochikarai			
B-11	7	Ionchebi	1.0	0.4	0.4
B-12	200	Enyu	2.7	2.3	<0.3
B-13	12	Airukirau	0.5	<0.3	<0.3
B-14	12	Bigiren	0.5	<0.3	<0.3
B-15	12	Reere	4.6	0.9	2.0
B-16	12	Eninman			
B-17	34	Endrik	7.9	4.2	2.2
B-18	212	Rukoji	42	29	8.9
B-19	212	Chieerete	45	35	7.9
B-20	215	Arriikan	12.6	9.7	2.8
B-21	215	Ourukaen	9.9	6.3	3.1
B-22	215	Bokoaetokutoku	5.4	2.7	2.9
B-23	215	Bokororyuru	11.4	8.5	3.3

* Extrapolated from aerial data obtained at an altitude of 38 meters (125 feet). An additional 3.3 μ R/h due to cosmic ray contributions must be added to obtain the total external exposure rate.

Northern Marshall Islands
Aerial Radiation Survey

Preliminary Data Summary
Rongelap Atoll

Island Number	Frame Number	Marshallese Name	Total Gross Count	Average Terrestrial Exposure Rate * (μ R/h at 1 meter) ^{137}Cs Component	^{60}Co Component
F-1	167	Naen			
F-2	167	Piganiyaroyaro	38	36	2.6
F-3	167	Yugui			
F-4	159	Aerik	27	25	2.0
F-5	159	Yugui			
F-6	189		-	-	-
F-7	189	Loniuflal	33	32	2.3
F-8	189	Gejan	22	20	1.5
F-9	153	Auknen	16	15	1.1
F-10	153	Eriirippu	-	-	-
F-11	139	Anielap	-	-	-
F-12	139				
F-13	139	Kabelle	11	10.3	0.9
F-14	139				
F-15	136	Mejatto	6.3	6.2	0.3
F-16	136		-	-	-
F-17	136	Yuzugan	-	-	-
F-18	179	Ribiyurigan	5.7	5.1	0.5
F-19	179	Laberedj	9.8	9.9	0.8
F-20	179				
F-21	179	Boken	7.9	7.2	0.6
F-22	179	Gabelle			
F-23	177	Mellu	4.5	3.9	0.4
F-24	175	Aniejat	7.6	6.5	0.5
F-25	175	Gogan	5.8	4.9	0.5
F-26	175		-	-	-
F-27	175		8.5	7.8	0.6
F-28	175	Kieshiechi			

* Extrapolated from aerial data obtained at an altitude of 38 meters (125 feet).
An additional 3.3 μ R/h due to cosmic ray contribution must be added to obtain the total external exposure rate.

Northern Marshall Islands

Aerial Radiation Survey

Preliminary Data Summary
Rongelap Atoll   (Continued)

Island Number	Frame Number	Marshallese Name	Average Terrestrial Exposure Rate * (μ R/h at 1 meter)		
			Total Gross Count	^{137}Cs Component	^{60}Co Component
F-29	172	Enybarbar	3.5	3.0	0.3
F-30	172	Bigannuo	6.2	6.5	0.5
F-31	80		5.1	5.3	0.5
F-32	80	Erapuotsu	7.1	7.2	0.5
F-33	80	Eniaetok			
F-34	200		-	-	-
F-35	200		-	-	-
F-36	200		-	-	-
F-37	200		-	-	-
F-38	200		2.8	2.6	0.3
F-39	196		-	-	-
F-40	196		-	-	-
F-41	196	Bokujarito	-	-	-
F-42	216	Rongelap	3.8	3.6	<0.3
F-43	72	Arbar	2.7	2.3	<0.3
F-44	72	Bikien	-	-	-
F-45	50	Eniroruuri	-	-	-
F-46	50	Eniran	2.9	2.4	<0.3
F-47	50	Tufa	3.7	3.0	<0.3
F-48	56	Arugaren	-	-	-
F-49	56	Burokku	5.9	5.2	0.3
F-50	7	Pokoreppu	-	-	-

* Extrapolated from aerial data obtained at an altitude of 38 meters (125 feet)
An additional 3.3 μ R/h due to cosmic ray contributions must be added to obtain
the total external exposure rate.

Northern Marshall Islands

Aerial Radiation Survey

Preliminary Data Summary

Rongerik Atoll

Island Number	Frame Number	Marshallese Name	Total Gross Counts	Average Terrestrial Exposure Rate * (μ R/h at 1 meter) ^{137}Cs Component	^{60}Co Component
G-1	74	Jedibberdib	2.6	2.1	<0.3
G-2	74	Latoback	4.7	4.5	0.3
G-3	70	Moterikku	-	-	-
G-4	70	Mortlock	4.9	4.9	<0.3
G-5	70	Bigonattam	5.2	5.2	0.3
G-6	70	Rongerik	4.8	4.6	0.3
G-7	85		-	-	-
G-8	85		-	-	-
G-9	85	Tarrowatt	-	-	-
G-10	64	Bokeredj	-	-	-
G-11	64	Enewetak	2.4	2.1	<0.3
G-12	102	Bock	4.7	4.6	0.3

* Extrapolated from aerial data obtained at an altitude of 38m (125 feet). An additional 3.3 μ R/h due to cosmic ray contributions must be added to obtain the total external exposure rate.