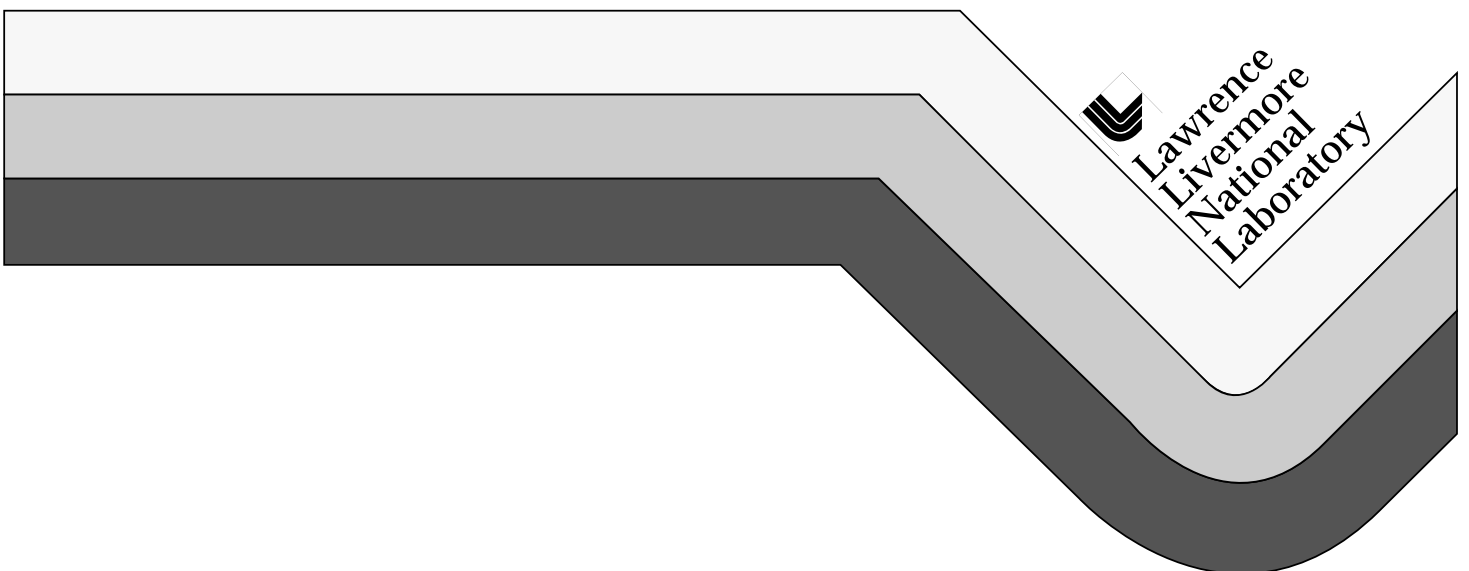


Sediment Studies at Bikini Atoll Part 2. Inventories of Transuranium Elements in Surface Sediments

**Victor E. Noshkin
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October 1997



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Manuscript date: October 1997



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Sediment Studies at Bikini Atoll Part 2. Inventories of Transuranium Elements in Surface Sediments

Victor E. Noshkin, Rodney J. Eagle, Kai M. Wong, William L. Robison

Abstract. *This is the second of three reports on Bikini sediment studies, which discusses the concentrations and inventories of ^{241}Am and $^{239+240}\text{Pu}$ in sediments from the lagoon. Surface sediment samples were collected from 87 locations over the entire lagoon at Bikini Atoll during 1979. The collections were made to map the distribution of long-lived radionuclides associated with the bottom material and to show what modifications occurred in the composition of the sediment as a result of the testing program. Present inventories for ^{241}Am and $^{239+240}\text{Pu}$ in the surface 2 cm of sediment are estimated to be 14 and 17 TBq, respectively. These values are estimated to represent only 14% of the total inventory in the sediment column. Sediment inventories of $^{239+240}\text{Pu}$ and ^{241}Am are changing only slowly with time through chemical-physical processes that continuously mobilize small amounts of the transuranics to the water column. The lowest concentrations and inventories are associated with deposits lagoonward of the eastern reef.*

Introduction

Bikini Atoll, located at about 11°36' N, 165°22' E, was one of two sites in the northern Marshall Islands used by the United States between 1946 and 1958 to test nuclear devices. Most of the 23 tests conducted at the atoll were detonated on barges anchored in the lagoon or on the reef. Two tests were airburst detonations, two were explosions under water, and three were ground surface explosions. The locations of the test sites within the atoll are described in Part 1 of this series of reports (Noshkin et al., 1997a). Each test produced some quantity of radioactive fission products, particle-induced radionuclides, or unspent nuclear fuel that became associated with the material incorporated in the fireball from the

explosions. Some of this material was deposited locally on islands and in the lagoon. The material deposited over the lagoon eventually settled to the surface of the bottom sediments. Today, only the longer-lived radionuclides are present and associated with environmental components of the Atoll. In the marine environment, these radionuclides are transferred among the sediments and to the water and the biota. Lagoon bottom and surface currents redistribute some material to different regions within the lagoon, and some quantities are transported with surface currents out of the lagoon into the north equatorial Pacific Ocean.

Prior to 1972, little information was available on the inventories or spatial distribution of radionuclides associated with the lagoon sediments. Only five early publications (Lynch et al., 1975; Held, 1971; Beasley and Held, 1971; Welander, et al., 1967; Schell and Yang, 1973) reported measuring specific radionuclides in a few sediment samples collected during 1964 and 1969 from craters and two mid-lagoon locations.

During October and November 1972, personnel from the Puerto Rico Nuclear Center (PRNC), the Laboratory of Radiation Ecology (LRE) at the University of Washington, and Lawrence Livermore National Laboratory (LLNL) participated in a sampling program of the marine environment of Bikini Lagoon. The program was conducted aboard the *R. V. Palumbo* from PRNC. The purpose of the study was to evaluate the distribution and concentration of the transuranium radionuclides in different components of the marine environment. Included among the collected samples were surface sediments (2.5 cm in depth) from 23 widely spaced stations and sediment cores from 9 locations. Additional sediment samples were obtained from within three nuclear craters. These samples provided data to make the first estimate on the concentrations of transuranics and their distribution in the bottom sediments of the

lagoon. The concentrations of the radionuclides in these samples have since been discussed in several publications (Marshall and Schell, 1974; Mo and Lowman, 1975; Nevissi and Schell, 1975; Noshkin et al., 1975; Schell and Watters, 1975; Schell et al., 1978; Noshkin and Wong, 1980; Schell et al., 1980; Noshkin et al., 1981; Schell, 1987).

Surface sediments were again sampled at 87 locations during 1979. The purpose of the collection was to better map the distribution of the transuranics and other long-lived radionuclides in the bottom surface sediments, to compare the concentrations with the 1972 results, and to assess any modification in specific sedimentary components that resulted from the testing program.

During the late 1970s and early 1980s, sediment studies were assigned a low priority in the marine radiological programs conducted at the Marshall Island Atolls. Analytical efforts were focused on studies that complemented cleanup at Enewetak Atoll, a large radiological survey of several other Northern Marshall Island Atolls, and resettlement at Bikini Atoll. As a result, the sediment data were set aside for assessment at a later date. Support for the marine studies in the Marshall Islands ended in 1984. Therefore, the sediment data from the 1979 program remained unpublished. There is now a need for this information because plans for resettlement at Bikini Atoll call for obtaining lagoon sediments to build causeways and to replace some contaminated soils on specific islands. A better knowledge of the radionuclide activity levels and sediment composition will aid in identifying preferred regions to dredge in the lagoon. Present support and facilities at the Atoll are not adequate to resample the entire lagoon bottom for new surface sediment samples. Therefore, the earlier results are now made available in a series of reports to address the original objectives and provide data for engineering considerations.

The first report (Noshkin et al. 1997a) of this three-part series addresses the distribution of the fine and coarse sedimentary components in the bottom surface sediments. This second report presents data related to the concentrations of ^{241}Am and $^{239+240}\text{Pu}$ radionuclides in the sediment samples. The third report (Noshkin et al. 1997b) in this

series will review and discuss the concentrations of other longer-lived radionuclides measured in these bottom surface sediment samples.

Collection and Processing

Shipboard procedures used for the collection of sediment samples during 1979 are described in Part 1 of this series (Noshkin et al., 1997a). Similar techniques were used in 1972 aboard the RV Palumbo. Sampling locations during the 1972 and 1979 programs are shown in Figure 1.

All samples were placed in plastic bags, frozen, and returned to the laboratories for processing and analysis. At LLNL, the wet weights of the 1972 and 1979 collections were determined. Most of the composite samples were then sieved through a 0.5-mm screen to separate the less than 0.5-mm fraction from the coarse components. Frozen core samples were sectioned into different depth increments before processing. Some sections of the cores were also sieved to separate the fine and coarse fraction. Other sections of cores were processed without separation. Each fraction was dried and weighed. When applicable, the fraction of fine material in the total sample was determined. The amount of Halimeda remains, shell fragments, and foraminifera in the coarse fraction were estimated in the 1979 samples. Both the fine and coarse fractions were ball milled and transferred to containers for analysis by gamma spectrometry using several Ge(Li) detection systems.

Counting times were usually 1000 min or longer for each sample. A general-purpose computer program was used for the data reduction of all gamma-ray spectra. A brief description of the gamma-ray program and an account of our quality assurance effort are given in Noshkin, et al. (1988). All radionuclide data were corrected to date of collection. The man-made gamma-emitting radionuclides identified and above detection limits in most 1972 and 1979 fine and coarse components included ^{241}Am , ^{155}Eu , ^{60}Co , ^{207}Bi , and ^{137}Cs . The radionuclides, $^{102\text{m}}\text{Rh}$, ^{152}Eu , ^{125}Sb , and ^{101}Rh , were sometimes found in concentrations above detection limits in samples collected primarily near test site locations. The third report of this series (Noshkin et al., 1997b) is a summary of the

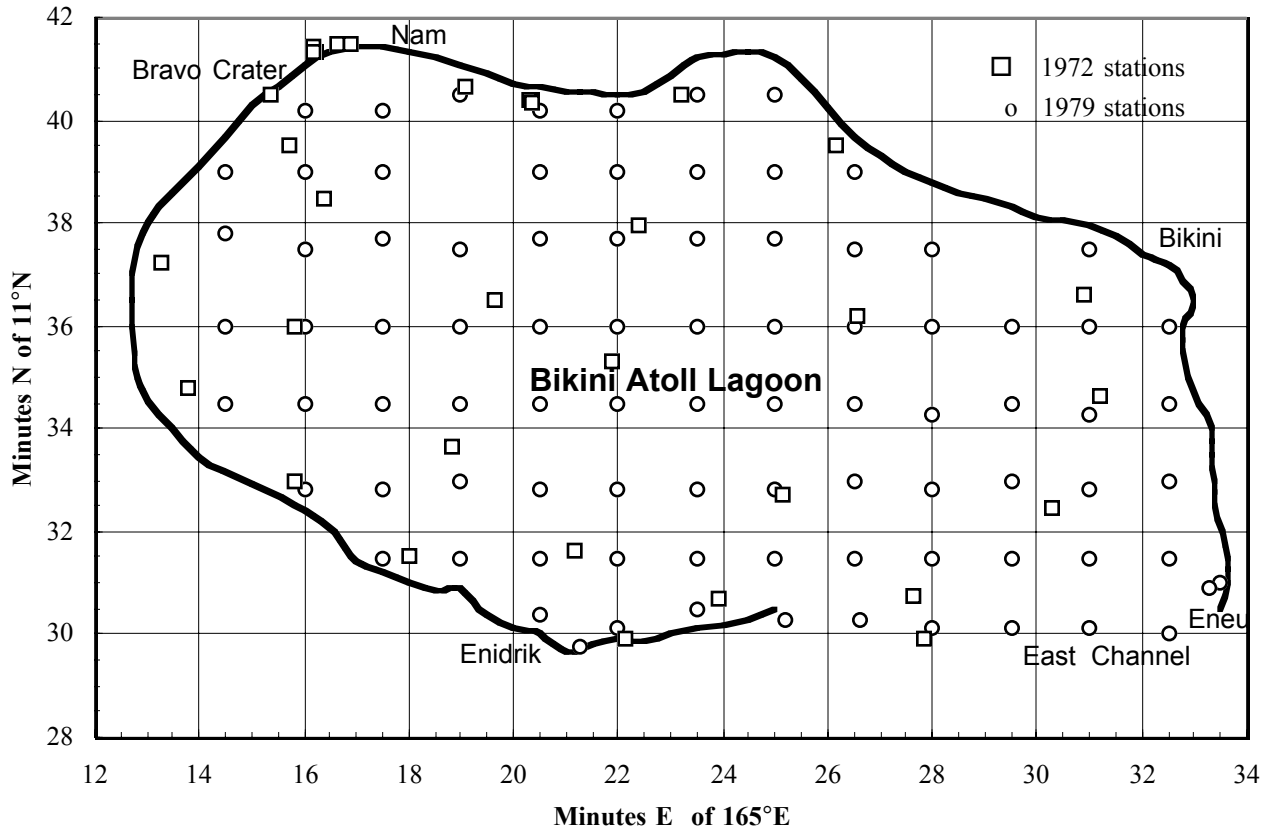


Figure 1. Station locations during the 1972 and 1979 sediment collection programs.

concentrations and distributions of ^{155}Eu , ^{60}Co , ^{207}Bi , and ^{137}Cs in the sediments from Bikini lagoon.

Chemical separations, following the methodology described in Wong et al. (1994), were used to isolate and determine the concentrations of $^{239+240}\text{Pu}$ and the ^{241}Am to $^{239+240}\text{Pu}$ concentration ratios in a selected number of the 1979 samples.

Results

Sample data and radiological results for ^{241}Am and $^{239+240}\text{Pu}$ are provided in the appendices. Appendix A describes the surface sediments collected in 1972. Appendix B describes the core samples collected in 1972. Appendix C describes the 0–2 cm deep surface sediment samples collected in 1979. Appendix D contains information on the 0–4 cm deep surface sediment samples collected in 1979. Appendix E contains data on concentrations and inventories of ^{241}Am in the fine and coarse fraction and total sample of surface sediment collected in 1972. Appendix F contains data on concentrations and inventories of ^{241}Am in sections of core samples collection in 1972. Appendix G contains concentrations and inventories of ^{241}Am in the surface 0–2 cm section of surface sediment and the ^{241}Am : $^{239+240}\text{Pu}$ ratios in selected samples collected in 1979. Appendix H contains concentrations and inventories of ^{241}Am in the 0–4 cm section of surface sediment collected in 1979.

Discussion

Concentrations of ^{241}Am in Surface Sediments

The radiological data in the appendices for ^{241}Am are expressed in activity units (Bq) per unit dry weight (kg) and as activity (kBq) per unit area (m^2) associated with the fine and coarse fractions and in the reconstructed whole sample. Each unit is useful to describe certain features of the analytical data.

Concentration data for ^{241}Am in the fine and coarse fractions from the 0–2 cm surface sections (from Appendix G) are plotted on a lagoon chart at the stations sampled. Isoconcentration lines were constructed to define regions of the bottom sediment with similar concentrations. The resulting

distributions of ^{241}Am associated with the fine (<0.5–mm) and coarse (>0.5–mm) bottom material are shown in Figures 2 and 3. The radionuclide is everywhere associated with the fine and coarse sedimentary components. The concentrations in both fractions from the regions outside the 100 Bqkg^{-1} contours ranged from 10 to 99 Bqkg^{-1} . The highest concentration are associated with the sediments from the northwestern quadrant of the lagoon, adjacent to the locations of the larger explosions (see Part 1 for test locations in the atoll). Surface concentrations in both fractions decrease from the north to the south and from the west to the east. The highest concentration in the samples collected was associated with the coarse fraction from the lagoon near Bravo crater. Figure 4 shows the ratio of activity for ^{241}Am in the coarse to fine fractions. There are several small areas in the western and central lagoon and larger regions lagoonward of the eastern reef and near the east channel where the activity in the coarse fraction is equivalent to or greater than the activity associated with the fine material. Elsewhere, most of the activity is associated with the fine sedimentary material. In the region west of $165^{\circ}24'E$ and north of $11^{\circ}36'N$, the average activity ratio, at the stations where the ratios are <1, is 0.4 ± 0.2 . In the remainder of the lagoon, at stations where the activity ratios are <1, the mean activity ratio is 0.7 ± 0.2 .

^{241}Am and $^{239+240}\text{Pu}$ Inventories in Surface Sediment

The primary purpose of this report is to define the distribution and estimate the inventory of radionuclides that remain associated with the lagoon sediments. Therefore, the activity per unit area better describes distributions and is the more useful unit for making relative comparisons of areal and temporal changes in inventories.

Inventories of ^{241}Am in the bottom sediment to depths of 2 and 4 cm from the data in Appendices G and H were also plotted on lagoon charts. Isoconcentration lines were constructed to distinguish regions of the bottom surface sediment with comparable inventories. Figures 5 and 6 show the kBqm^{-2} of ^{241}Am in the bottom sediment to depths of 2 and 4 cm, respectively. Ordered inventory values in the

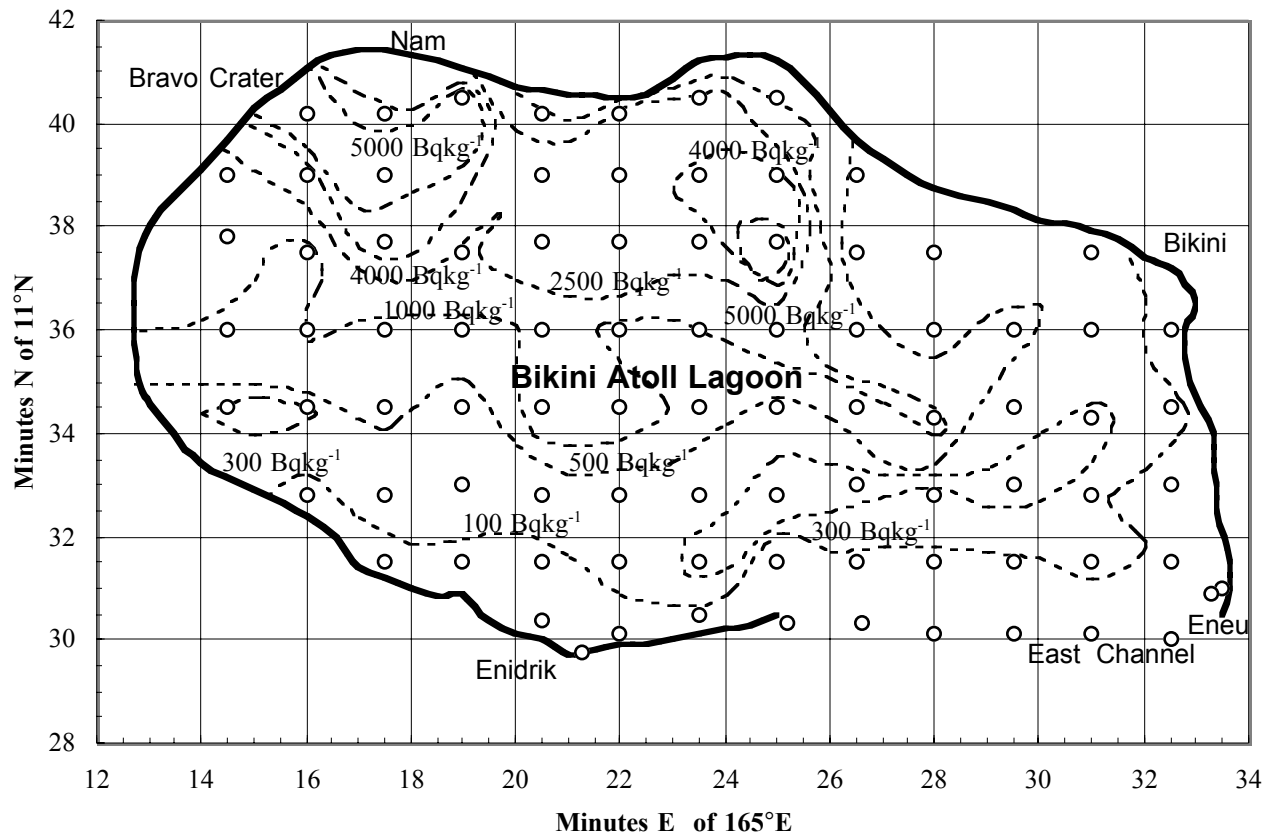


Figure 2. Isoconcentration plot of activity for ^{241}Am (Bqkg^{-1}) in the fine components (<0.5 mm) in surface (0–2 cm depth) sediments from 1979.

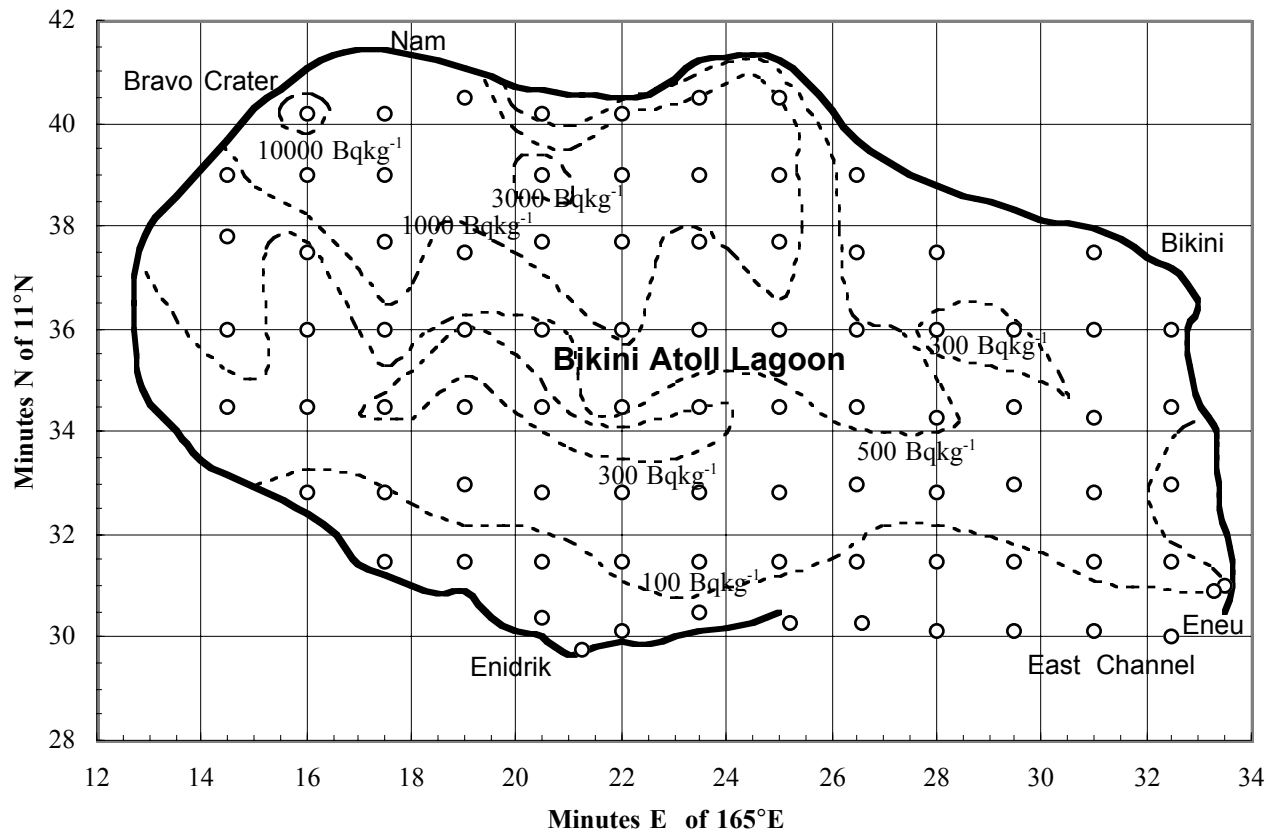


Figure 3. Isoconcentration plot of activity for ^{241}Am (Bqkg⁻¹) in the coarse components (>0.5 mm) in surface (0–2 cm depth) sediments from 1979.

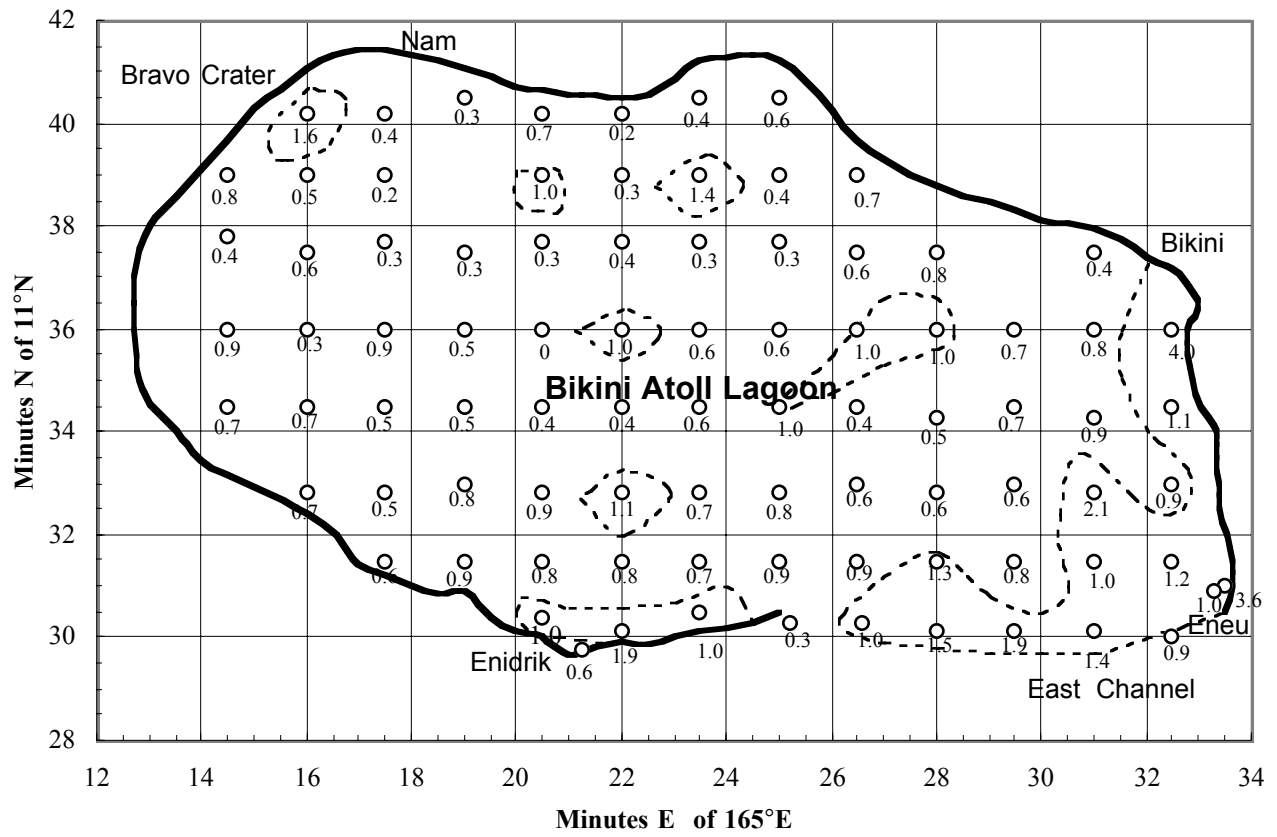


Figure 4. Coarse-to-fine activity ratios for ^{241}Am at lagoon stations sampled in 1979.

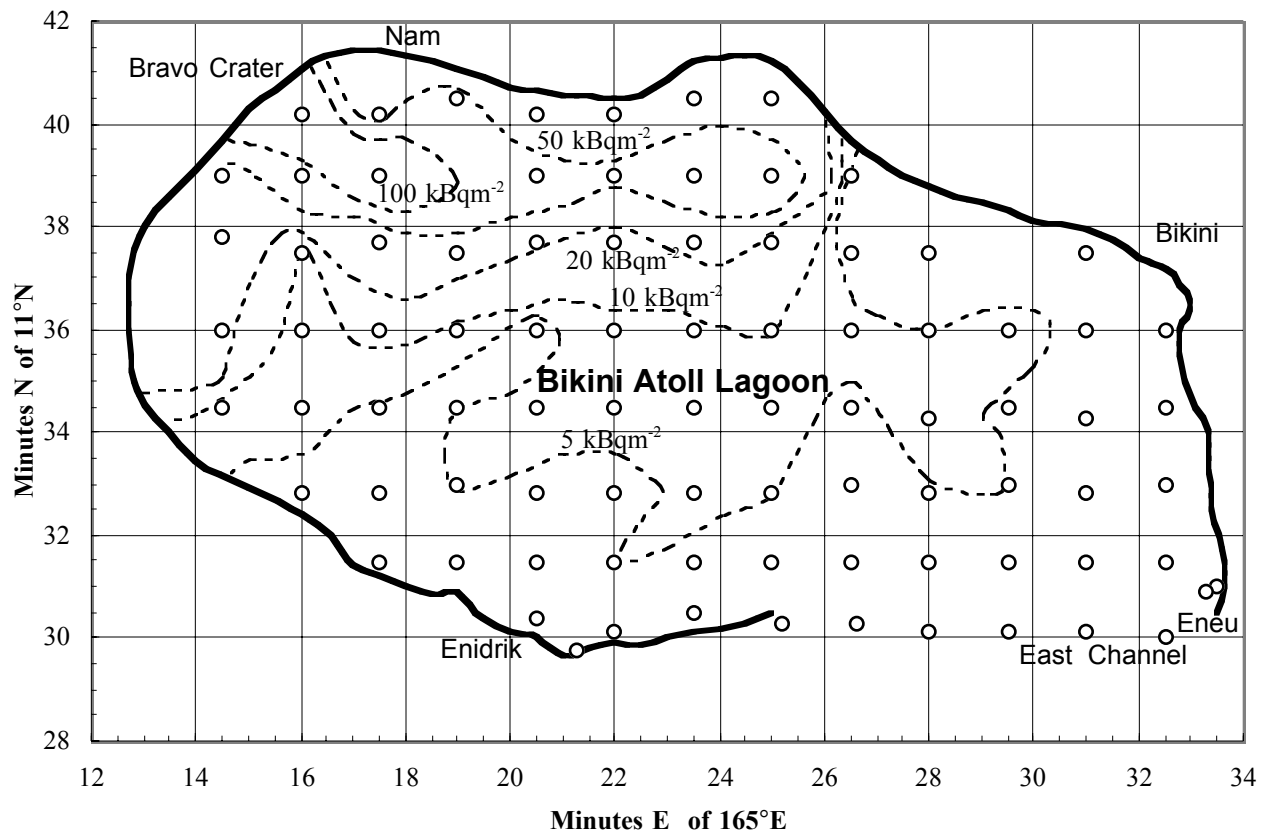


Figure 5. Isoconcentration plot of the inventory for ^{241}Am (kBqm^{-2}) in the total sample (fine + coarse) in surface (0–2 cm depth) sediments from 1979.

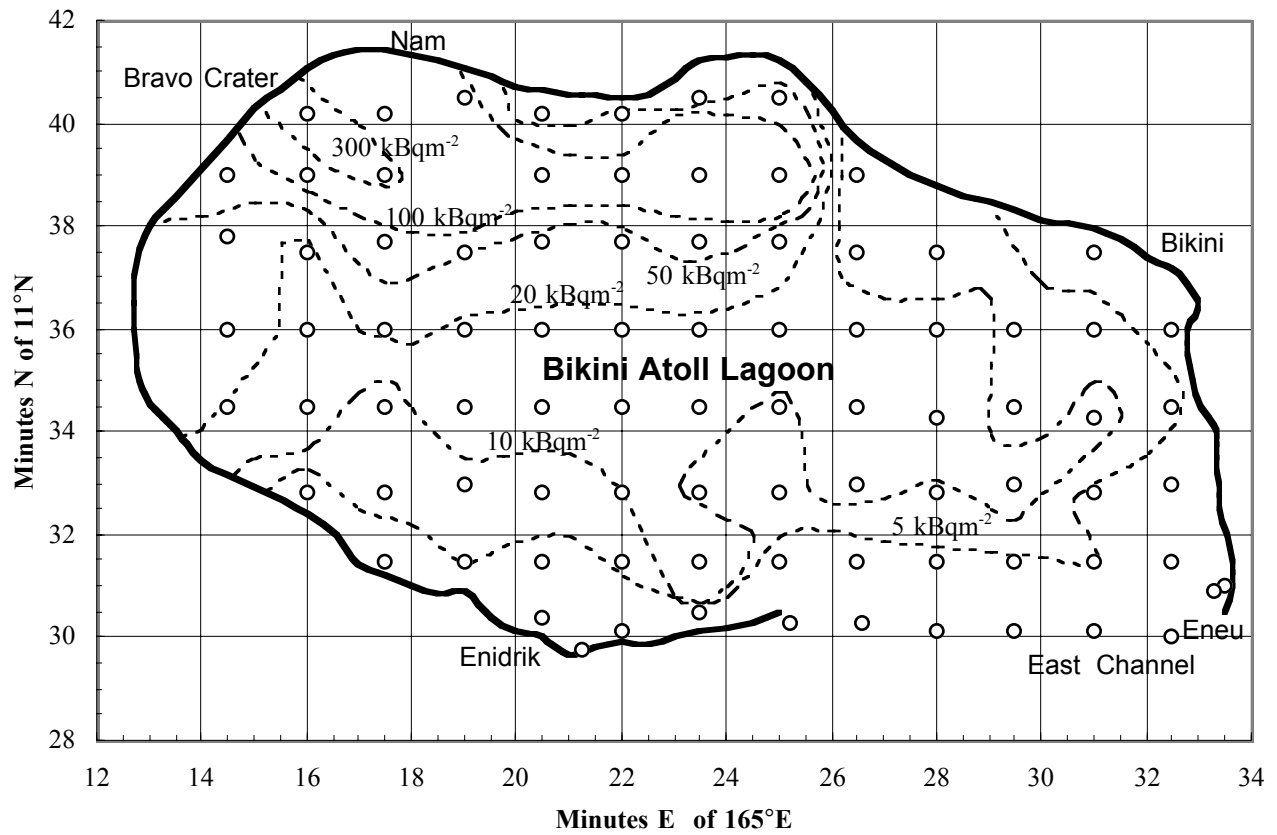


Figure 6. Isoconcentration plot of the inventory for ^{241}Am (kBq m^{-2}) in the total sample (fine + coarse) of surface (0–4 cm depth) sediments from 1979.

enclosed regions plot reasonably well as a straight line on a log normal probability plot. Therefore, throughout this report, mean values for inventories and the associated variances are computed assuming all data are log normally distributed.

The area between the contour intervals is determined along with the ln normal mean inventory (kBq m^{-2}) from the data associated with each station included in the respective region. Multiplying the area by the mean inventory provides an estimate of the total amount of ^{241}Am associated with the sediment within a region. Summing these quantities produces an estimate of the total amount of ^{241}Am associated with surface 2- and 4-cm layer of sediment over the entire lagoon. A comparable procedure is used with the smaller number of 1972 data points [and some supplemental ^{241}Am sediment data from Schell et al. (1980)] to arrive at estimates of ^{241}Am inventories within specific intervals. Respective areas and mean inventories for the 1972 and 1979 data sets are shown in Table 1.

In Table 2, the 1972 mean lagoon inventory, determined to a depth of 2.5 cm, is corrected to a depth of 2 cm. To do so, it is assumed the surface sediments are well mixed over a few centimeters and that the inventory increases linearly with depth. This assumption is supported by comparing the activity of ^{241}Am in the 0-4 and 0-2 depth increments from the same stations in the 1979 collections. From Appendix H, the mean activity ratio in 70 comparable samples is 1.2 ± 0.4 , and the average inventory ratio is 2.2 ± 1.0 . This comparison indicates that the radionuclide is reasonably well mixed over at least the first 4 cm of surface sediment. Therefore, the inventory of ^{241}Am to a depth of 2.0 cm in 1972 is estimated to be 0.8 times the value measured at 2.5 cm. In addition, the inventory to 4.0 cm in 1979 is multiplied by 0.5 to provide another comparative value to a depth of 2 cm. This value is also shown in Table 2.

The 1972 value for ^{241}Am is decay corrected to 6/1979 for comparison with the total inventory determined in 1979. Two assumptions are necessary to make this correction. It is assumed that loss (gain) from the sediment surface during the intervening 6.58 years is from radioactive decay (growth). Mobilization from the sediments accounts for some additional loss,

but the amount of ^{241}Am and $^{239+240}\text{Pu}$ found at any time in the lagoon water represents a very small fraction ($<0.1\%$) of the sediment inventory (Noshkin, 1980; Noshkin and Wong, 1980). An additional small loss is due to decay, but the largest change in the inventory of ^{241}Am is from ingrowth due to ^{241}Pu decay. Values for ^{241}Am and ^{241}Pu were taken from the 1972 growth increment in a sample of living coral from Bikini lagoon (Noshkin et al., 1975). The relative amounts of the radionuclides in this one sample were assumed to be representative of the relative amounts in the entire lagoon. The appropriate growth-decay equation was used to estimate the change in the level of ^{241}Am during 6.58 years.

In 1972, the inventory for $^{239+240}\text{Pu}$ was estimated from the mean of 20 activity ratios determined for $^{241}\text{Am}/^{239+240}\text{Pu}$ (0.53 ± 0.17) in surface sediments by Schell, et al., (1980) and the estimated 1972 mean ^{241}Am inventory value in Table 1.

In 1979, the estimated inventory for $^{239+240}\text{Pu}$ is based on the mean ^{241}Am to $^{239+240}\text{Pu}$ concentration ratio of 0.69 ± 0.17 determined in 19 measured ratios shown in Appendix G and the measured ^{241}Am inventory in Tables 1 and 2. The individual activity ratios at the 19 stations sampled are shown in Figure 7. Somewhat higher ratios are evident in the surface sediment from the NW section of the lagoon. A mean activity ratio of 0.86 ± 0.09 is computed from the six samples in the NW section of the lagoon. The samples from the remainder of the lagoon have a mean activity ratio of 0.61 ± 0.13 . The difference is not considered significant because of the limited amount of available data. Therefore, the mean activity ratio of 0.69 ± 0.17 , rather than an assessment of an isoconcentration plot, is used to estimate the $^{239+240}\text{Pu}$ inventory. Mean inventories estimated during 1972 and 1979 are shown in Table 2.

Distribution with Depth in Sediment Column

The sediments appear well mixed to at least a depth of 4 cm. Table 3 shows the inventories for ^{241}Am in the 1972 core samples to the maximum depth sampled. The values are derived from data in Appendix F. The quantities in the 0-2 cm surface layer were determined from plots of the incremental

Table 1. Inventories of ^{241}Am in sediments from regions of Bikini lagoon based on 1979 and 1972 collections.Area of Bikini lagoon = 629 km².

^{241}Am inventory based on 1979 collections			
Inventory interval (kBqm ⁻²)	In normal mean (kBqm ⁻²)	Area of interval (km ²)	TBq in interval to depth of 2.0 cm
0-5	2.6 ± 1.8	277	0.7 ± 0.5
5-10	7.3 ± 1.7	148	1.1 ± 0.3
10-20	13.5 ± 2.6	44	0.6 ± 0.1
20-50	32.1 ± 9.9	84	2.7 ± 0.8
50-100	74.1 ± 17.6	54	4.0 ± 1.0
>100	177 ± 16	22	<u>3.9 ± 0.4</u>
		Lagoon total	13.0 ± 1.4
^{241}Am inventory based on 1979 collections			
Inventory interval (kBqm ⁻²)	In normal mean (kBqm ⁻²)	Area of interval (km ²)	TBq in interval to depth of 4.0 cm
0-5	2.7 ± 1.6	133	0.4 ± 0.2
5-10	7.6 ± 1.3	129	1.0 ± 0.2
10-20	14.5 ± 2.8	166	2.4 ± 0.5
20-50	30.9 ± 10.8	101	3.1 ± 1.1
50-100	71.9 ± 19.4	48	3.5 ± 0.9
100-250	140.5 ± 15.3	39	5.5 ± 0.6
>250	397	14	<u>5.6 ± 0.6</u>
		Lagoon total	21.4 ± 1.7
^{241}Am inventory based on 1972 collections			
Inventory interval (kBqm ⁻²)	In normal mean (kBqm ⁻²)	Area of interval (km ²)	TBq in interval to depth of 2.5 cm
0-5	2.7 ± 3.8	275	0.8 ± 1.0
5-10	6.9 ± 1.7	33	0.9 ± 0.2
10-20	16.0 ± 1.9	71	1.1 ± 0.1
20-50	30.8 ± 5.6	102	3.2 ± 0.6
>50	74.6 ± 7.0	49	<u>3.7 ± 0.3</u>
		Lagoon total	9.6 ± 1.3

Table 2. Comparison of 1972 decay-corrected and 1979 mean inventories for ^{241}Am and $^{239+240}\text{Pu}$.

^{241}Am			
Inventory to 2.5 cm (1972)	Interpolated inventory to 2.0 cm (1972) ^a	Decay corrected 2.0 cm inventory to 6/1979 ^b	Measured 2.0 cm inventory on 6/1979
9.6 ± 1.3	7.7 ± 1.0	8.8 ± 1.2^c	13.0 ± 1.4 11.0 ± 0.9^f mean 11.8 ± 1.6
$^{239+240}\text{Pu}$			
18.1 ± 6.3^d	14.5 ± 5.0^d	14.5 ± 5.0	18.8 ± 5.1^e $15.5 \pm 4.4^{e,f}$ mean 17.1 ± 2.3^e

^aAssumes inventory over first 2.5 cm is well mixed. Inventory to 2.0 cm is 0.8 times the value to 2.5 cm. (see text).

^bAssumes loss from sediment surface during the intervening years is only from radioactive decay (growth).

^cBased on ingrowth from ^{241}Pu during 6.58 years. Values for ^{241}Am and ^{241}Pu from 1972 growth increment in sample of living coral from Bikini (Noshkin et al., 1975).

^dBased on mean ^{241}Am to $^{239+240}\text{Pu}$ concentration ratio of 0.53 ± 0.17 determined in 20 surface sediment samples in 1972 (Schell et al., 1980) and ^{241}Am inventory value listed above (1972).

^eBased on mean ^{241}Am to $^{239+240}\text{Pu}$ concentration ratio of 0.69 ± 0.17 measured in 19 surface sediment samples in 1979 (Appendix G) and ^{241}Am inventory values listed above (1979).

^fAssumes inventory over first 4 cm is well mixed. Inventory to 2.0 cm is 0.5 times the value to 4.0 cm.

Table 3. Core inventories and percent activity of ^{241}Am in the surface 2 cm of core samples.

Core ID	Maximum depth sampled (cm)	Total kBqm ⁻² to maximum depth	Percent in 0–2 cm section
All Samples (1979)	4	21	45
B4	7	6	24
B18	10.5	374	16
B15	15	10	14
B16	15	11	15
B20	15	214	22
B25	8	100	9
B3	35	66	12

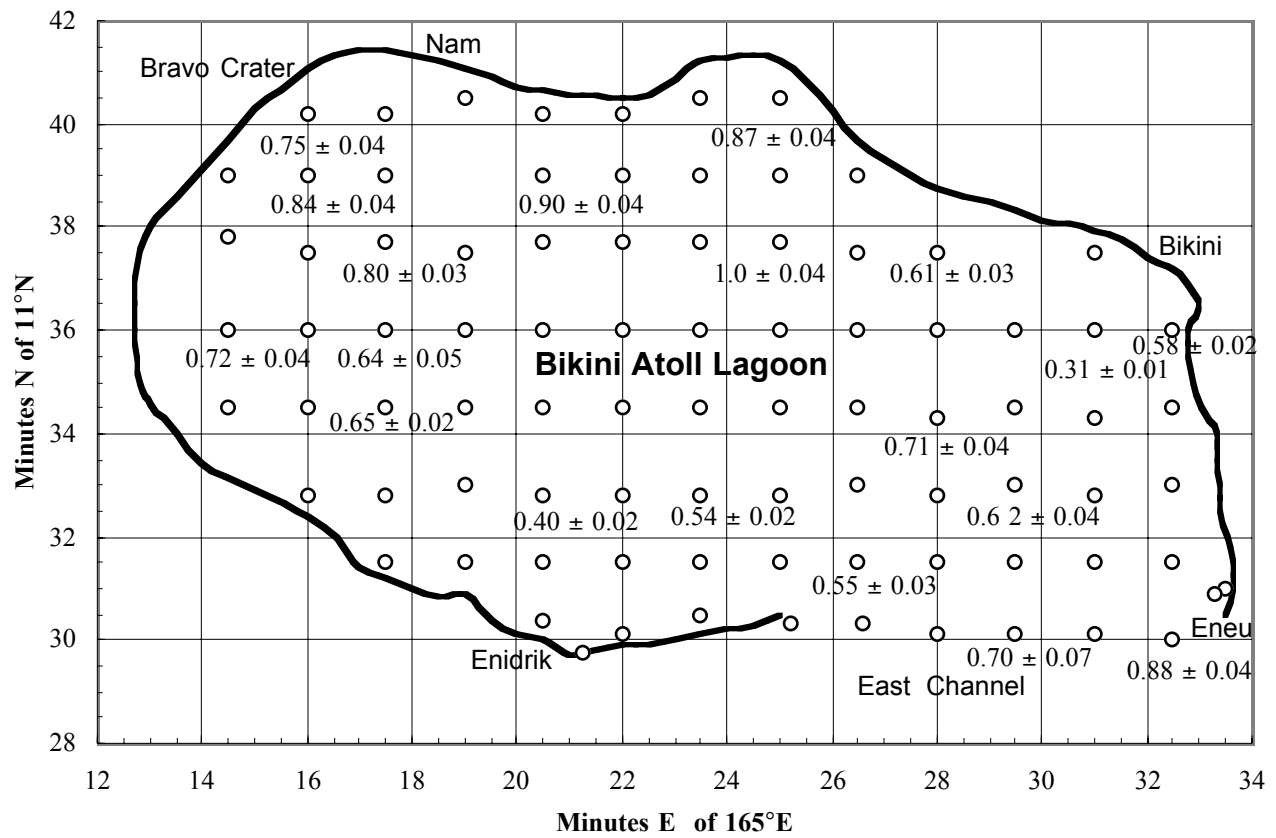


Figure 7. Concentration ratio of ^{241}Am to $^{239+240}\text{Pu}$ in surface sediments from selected stations in lagoon during 1979.

concentration data with depth. The percent of the inventory in the 0–2 cm layer is compared to the total at the maximum depth sampled. There appear to be two zones in the sediment column. To about 9 cm in the sediment column, the inventory increases approximately in a linear fashion. Below about 10 cm, the total inventory changes slowly if at all. The inventory in the 0–2 cm layer compared to the total inventory (to depths of 10–35 cm) in the core is about $14 \pm 5\%$. Assuming this is a representative fraction over the entire lagoon for both ^{241}Am and $^{239+240}\text{Pu}$, then the total inventory to depth in the sediment in 1979 is estimated to be 84 and 122 TBq for ^{241}Am and $^{239+240}\text{Pu}$, respectively. These values should be viewed as lower limits because radionuclides are evident at greater depths in some cores from Enewetak (Noshkin, 1980; McMurtry, et al., 1985).

Conclusions

There is reasonable agreement between the estimate of the mean lagoon inventory for ^{241}Am in the 0–2 cm surface section of sediment based on the samples collected in 1972 and the value estimated from the 1979 collection. Only small quantities of the transuranics are lost by remobilization processes from the sedimentary reservoir to the water column of the lagoon. Surface inventories (0–2 cm) for ^{241}Am and $^{239+240}\text{Pu}$ are estimated to be approximately 14 and 17 TBq, respectively, when decay corrected to 6/1996. The inventories to greater depths are estimated to be about 100 and 120 TBq, respectively. These amounts should be considered to be minimum values of the present inventories for these transuranics in the lagoon sediments. The inventory of americium and plutonium in the lagoon surface sediment will only slowly change with time unless the chemical-physical processes that now regulate the release of the isotopes to the water column are changed or altered.

Inventories and concentrations of the transuranics are lowest in surface sediments from the eastern region of the lagoon. This is the portion of the atoll where the main residence islands have been and will be located. Sediments in the region consist mainly of fine material (Noshkin et al., 1997a). Low concentrations of transuranics are found in the sediment lagoonward of the eastern reef. This

area would appear to be the preferred region of the lagoon to dredge if low concentrations of transuranics and quantities of fine material are prerequisites for local construction material.

Acknowledgments

The authors acknowledge the assistance of Mr. K. V. Marsh and Mr. J. Schweiger in collecting lagoon sediment samples.

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Appendix A

Description of Bikini Lagoon Surface Sediments (0–2.5 cm) Collected During 10–11/1972

Appendix A. Description of Bikini lagoon surface sediments (0–2.5 cm) collected during 10–11/1972.

Station No.	MSC No.	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total dry wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
B3	44f	91	102.4			13.28	37.22	28.3
B3	44c		39.8	142.2	0.72			
B19	54f	91	14.8			19.10	40.63	21.5
B19	54c		50.1	64.9	0.23			
B18	55f	91	37			23.22	40.52	29.0
B18	55c		62.3	99.3	0.37			
B21	56f	91	90.4			15.83	36.00	52.0
B21	56c		33.2	123.6	0.73			
B22	57f	91	10.8			19.63	36.52	56.7
B22	57c		40.5	51.3	0.21			
B24	59f	91	6			22.40	37.93	42.1
B24	59c		49.4	55.4	0.11			
C11	66f	91	52.6			22.15	29.93	25.2
C11	66c		54.4	107	0.49			
C8	68f	91	97.6			20.33	40.37	40.7
C8	68c		6.65	104.25	0.94			
B2	69f	91	98.9			15.70	39.50	52.0
B2	69c		8.3	107.2	0.92			
B4	45f	91	17.3			13.78	34.77	32.0
B4	45c		103.3	120.6	0.14			
B6	46f	91	90.3			15.83	33.00	31.1
B6	46c		44.7	135	0.67			
B7	47f	91	71.3			18.00	31.55	49.6
B7	47c		51.7	123	0.58			
B8	48f	91	73.5			21.16	31.63	43.7
B8	48c		62.3	135.8	0.54			
B10	49f	91	14.1			27.82	29.90	73.2
B10	49c		103.3	117.4	0.12			
B11	51f	91	58.1			27.65	30.73	30.8
B11	51c		65.5	123.6	0.47			
B16	53f	91	29.6			26.17	39.52	20.0
B16	53c		51.5	81.1	0.36			
B23	58f	91	68.3			18.82	33.66	48.6
B23	58c		58.2	126.5	0.54			
B25	60f	91	26.2			21.86	35.33	50.4
B25	60c		81.7	107.9	0.24			
B26	61f	91	2.75			26.58	36.20	44.8
B26	61c		40.6	43.35	0.06			

Appendix A. (Continued).

Station No	MSC No	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total dry wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
B15	64f	91	51.9			30.88	36.63	31.7
B15	64c		50.7	102.6	0.51			
C6	29f	91	91			20.30	40.37	38.2
C6	29c		19.6	110.6	0.82			

f = fine; c = coarse

Appendix B

Description of Bikini Lagoon Sediment Cores Collected During 10–11/1972

Appendix B. Description of Bikini lagoon sediment cores collected during 10–11/1972.

Station number & date collected	Depth increment (cm)	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
B-3 11/8/72	0–5f	181.6	111.1			13.28	37.22	28.3
	0–5c		132	243.1	0.46			
	5–10f	181.6	48.9					
	5–10c		115	163.9	0.30			
	10–15f	181.6	52.7					
	10–15c		116.5	169.2	0.31			
	15–20f	181.6	50.4					
	15–20c		102.2	152.6	0.33			
	20–25f	181.6	53.4					
	20–25c		108.5	161.9	0.33			
	25–30f	181.6	56.3					
	25–30c		123.3	179.6	0.31			
	30–35f	181.6	47.8					
30–35c		122.9	170.7	0.28				
B-4 11/8/72	0–3	109	88.6	88.6		13.78	34.77	32
	3–6	109	123.3	123.3				
	6–7	36.3	30.3	30.3				
B-16 11/4/72	0–3	109	119.9	119.9		27.17	39.52	20
	3–6	109	97.3	97.3				
	6–9	109	97.7	97.7				
	9–12	109	97.2	97.2				
	12–15	109	97.2	97.2				
B-18 11/4/72	0–3	109	122.1	122.1		23.22	40.52	29
	3–6	109	109.1	109.1				
	6–9	109	121.2	121.2				
	9–10.5	54.5	61.2	61.2				
B-20 11/8/72	0–5f	181.6	180.1			16.38	38.5	56
	0–5c		11.56	191.66	0.94			
	5–10f	181.6	184.2					
	5–10c		9.48	193.68	0.95			
	10–15f	181.6	96.7					
	10–15c		69.3	166	0.58			

Appendix B. (Continued).

Station number & date collected	Depth increment (cm)	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
B-25 11/5/72	0-3	109	70.9	70.9		21.86	35.33	50.4
	3-6	109	83.3	83.3				
	6-9	109	90.7	90.7				
	9-12	109	96.7	96.7				
	12-15	109	100.1	100.1				
	15-18	109	98.4	98.4				
C-2 11/13/72 Bravo Crater	0-6	218	86	86		16.62	41.47	47.1
	6-12	218	154.5	154.5				
	12-18	218	187.8	187.8				
	18-24	218	183	183				
	24-30	218	177.4	177.4				
	30-36	218	192	192				
	36-42	218	187.3	187.3				
	42-48	218	195	195				
	48-54	218	182	182				
	54-60	218	229.2	229.2				
	60-66	218	201	201				
	66-72	218	194.8	194.8				
	72-78	218	191.4	191.4				
	78-84	218	198.8	198.8				
	84-90	218	209.8	209.8				
	90-96	218	215	215				
96-102	218	217	217					
102-108	218	210	210					
108-114	218	202	202					
114-120	218	228	228					
C-3 11/13/72 Bravo Crater	0-6	218	213	213		16.17	41.42	47.4
	6-12	218	196.1	196.1				
	12-18	218	236.2	236.2				
	18-24	218	237.2	237.2				
	24-30	218	240.1	240.1				
	30-36	218	234.6	234.6				
	36-42	218	231.8	231.8				
42-48	218	237.7	237.7					

Appendix B. (Continued).

Station number & date collected	Depth increment (cm)	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
C-1 11/13/72 Bravo Crater	0-6	218	249.5	249.5		16.88	41.5	45
	6-12	218	268.1	268.1				
	12-18	218	257.4	257.4				
	18-24	218	250	250				
	24-30	218	264.2	264.2				
	30-36	218	257.4	257.4				
	36-41	182	200.5	200.5				
C-11 11/14/72 Zuni Crater	0-6	218	281	281		22.15	29.93	28
	6-12	218	259.1	259.1				
	12-18	218	257	257				
	18-24	218	255.6	255.6				
	24-31	182	273.5	273.5				
C-8 11/14/72 Tewa Crater	0-6	218	190.5	190.5		20.33	40.37	40.7
	6-12	218	237.2	237.2				
	12-17.5	200	231	231				
B-15 10/31/72	0-2.5f	90.8	44.4			30.88	36.63	31.7
	0-2.5c	90.8	39.7	84.1	0.53			
	2.5-5.0f	90.8	68.8					
	2.5-5.0c	90.8	57.2	126	0.55			
	5.0-7.5f	90.8	50.5					
	5.0-7.5c	90.8	79.7	130.2	0.39			
	7.5-10.0f	90.8	42.7					
	7.5-10.0c	90.8	62	104.7	0.41			
	10.0-12.5f	90.8	29.4					
10.0-12.5c	90.8	70.6	100	0.29				

All cores: diameter = 6.8 cm; area = 36.32 cm².

f = fine; c = coarse fraction

Appendix C

Description of Bikini Lagoon Surface Sediments (0–2 cm) Collected During 4–6/1979

Appendix C. Description of Bikini lagoon surface sediments (0–2 cm) collected during 4–6/1979.

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
4/22/79–1F	7400	117.9	110.37			33.5	31	6
C	7401		36.71	147.08	0.75			
2F	2	117.9	25.93			32.5	30	25
C	3		121.3	147.23	0.18			
3F	4	117.9	63.21			32.5	31.5	49
C	5		71.52	134.73	0.47			
4F	8	117.9	65.81			32.5	33	38
C	9		90.14	155.95	0.42			
5F	12	117.9	33.47			32.5	34.5	31
C	13		77.68	111.15	0.30			
6F	16	117.9	144.06			32.5	36	21
C	17		17.28	161.34	0.89			
7F	18	117.9	14.02			31	37.5	25
C	19		58.84	72.86	0.19			
9F	22	78.6	33.37			28	37.5	29–39
C	23		63.59	96.96	0.34			
10F	24	117.9	20.27			26.5	37.5	49
C	25		98.87	119.14	0.17			
11F	28	117.9	3.77			26.5	36	49
C	29		54.36	58.13	0.06			
12F	32	117.9	4.58			28	36	51
C	33		56	60.58	0.08			
13F	36	117.9	7.94			29.5	36	45
C	37		70.23	78.17	0.10			
14F	40	117.9	93.35			31	36	48
C	41		64.45	157.8	0.59			
4/23/79–1F	42	117.9	57.86			29.5	34.5	54
C	43		94	151.86	0.38			
2F	46	117.9	23.17			29.5	33	56
C	47		77.03	100.2	0.23			
3F	50	117.9	70.72			29.5	31.5	44
C	51		102.15	172.87	0.41			
4/24/79–1F	54	117.9	66.47			26.5	31.5	42
C	55		92.22	158.69	0.42			
2Fa	58	117.9	10.6			26.5	33	52–54
C	59		73.9	84.5	0.13			
2Fb	62	117.9	26.9					
C	63		73.8	100.7	0.27			
3Fa	66	117.9	3.7			26.5	34.5	52–53

Appendix C. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
C	67		55.6	59.3	0.06			
3Fb	70	117.9	2.1					
C	71		56	58.1	0.04			
4F	74	117.9	26.1			25	34.5	52
C	75		94.7	120.8	0.22			
5F	78	117.9	1.9			23.5	34.5	54
C	79		61.1	63	0.03			
6F	82	117.9	8.2			22	34.5	54
C	83		55.8	64	0.13			
7F	86	117.9	7.2			20.5	34.5	47
C	87		59.6	66.8	0.11			
8F	90	117.9	82.2			19	34.5	49
C	91		81.3	163.5	0.50			
9Fa	92	117.9	66.7			17.5	34.5	54
C	93		47.2	113.9	0.59			
9Fb	94	117.9	102.2					
C	95		57.9	160.1	0.64			
10F	96	117.9	145			16	34.5	48
C	97		44.4	189.4	0.77			
11F	7500	117.9	113.3			14.5	34.5	44
C	1		61.5	174.8	0.65			
12F	4	117.9	125.5			14.5	36	40
C	5		43	168.5	0.74			
13F	8	117.9	26.7			16	36	54
C	9		85.2	111.9	0.24			
14F	10	117.9	63.9			16	37.5	40
C	11		81.3	145.2	0.44			
15F	12	117.9	116.4			17.5	39	56
C	13		32	148.4	0.78			
17F	20	117.9	145.2			20.5	39	59
C	21		0.7	145.9	1.00			
4/25/79-1F	24	117.9	56.5			19	40.5	39-44
C	25		52.7	109.2	0.52			
2F	28	117.9	41.5			19	37.5	56
C	29		72.3	113.8	0.36			
3F	32	117.9	14.3			19	36	46-52
C	33		99.9	114.2	0.13			
4F	36	117.9	106.7			19	33	51
C	37		65.5	172.2	0.62			

Appendix C. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
5F	40	117.9	113.9			19	31.5	48
C	41		66.2	180.1	0.63			
6F	44	117.9	102.3			21.25	29.75	31
C	45		70.6	172.9	0.59			
6/15/79-IF	48	78.6	102.5			33.3	30.9	
C	49		4.5	107	0.96			
2F	52	78.6	66.9			31	31.5	48
C	53		35.6	102.5	0.65			
3F	56	78.6	58.5			28	31.5	46
C	57		44.4	102.9	0.57			
4F	60	78.6	44			25	31.5	44
C	61		61	105	0.42			
5F	64	78.6	7.4			23.5	31.5	48
C	65		47.7	55.1	0.13			
6F	68	78.6	76.5			22	31.5	44
C	69		82.5	159	0.48			
7F	72	78.6	41			20.5	31.5	42
C	73		66.3	107.3	0.38			
8F	76	78.6	73.7			17.5	31.5	36
C	77		36.7	110.4	0.67			
9F	80	78.6	34.1			16	32.8	32
C	81		69.4	103.5	0.33			
10F	84	78.6	67.3			17.5	32.8	45
C	85		47.5	114.8	0.59			
11F	88	78.6	63.8			20.5	32.8	54
C	89		35.5	99.3	0.64			
12F	92	117.9	58.2			22	32.8	52
C	93		70.1	128.3	0.45			
13F	96	78.6	70.2			23.5	32.8	57
C	97		36.6	106.8	0.66			
14F	7600	78.6	17.2			25	32.8	54
C	1		53.2	70.4	0.24			
15F	4	78.6	55.7			28	32.8	56
C	5		44.3	100	0.56			
16F	8	78.6	7.5			28	34.3	59
C	9		52.9	60.4	0.12			
17F	12	78.6	3.4			31	32.8	53
C	13		38.2	41.6	0.08			
18F	16	78.6	2.9			31	34.3	47

Appendix C. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
C	17		41.8	44.7	0.06			
6/16/79-1F	20	78.6	26.5			26.5	39	38
C	21		41.9	68.4	0.39			
2F	22	78.6	89.7			25	39	54
C	23		9.5	99.2	0.90			
3F	24	78.6	57.3			25	40.5	20
C	25		23.5	80.8	0.71			
4F	26	78.6	45			23.5	40.5	25
C	27		44.6	89.6	0.50			
5F	28	78.6	29.8			22	40.2	20
C	29		33.8	63.6	0.47			
6F	30	78.6	83.8			20.5	40.2	35
C	31		14.2	98	0.86			
7F	32	78.6	37.5			17.5	40.2	45
C	33		47.3	84.8	0.44			
8F	36	78.6	96.7			16	40.2	44
C	37		0.3	97	1.00			
9F	38	78.6	91.9			16	39	59
C	39		1.7	93.6	0.98			
10F	42	78.6	88.5			14.5	39	43
C	43		5.1	93.6	0.95			
11F	46	78.6	41			14.5	37.8	48
C	47		51	92	0.45			
12F	50	78.6	15.1			17.5	37.7	57
C	51		53.2	68.3	0.22			
13F	54	117.9	32.4			17.5	36	56
C	55		67.9	100.3	0.32			
14F	58	117.9	5.7			20.5	36	55
C	59		68.1	73.8	0.08			
15F	62	117.9	3.1			22	36	55
C	63		51.1	54.2	0.06			
16F	66	117.9	5.5			23.5	36	58
C	67		61.6	67.1	0.08			
17F	70	117.9	9.2			25	36	59
C	71		59	68.2	0.13			
18F	74	117.9	5.4			25	37.7	57
C	75		51	56.4	0.10			
19F	78	117.9	35			23.5	37.7	49
C	79		57.8	92.8	0.38			

Appendix C. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
20F	82	117.9	5.4			22	37.7	57
C	83		56	61.4	0.09			
21F	86	117.9	11			20.5	37.7	58
C	87		71.6	82.6	0.13			
22F	90	117.9	60.5			22	39	48
C	91		65.1	125.6	0.48			
23F	94	117.9	86.6			23.5	39	50
C	95		74.4	161	0.54			
6/17/79-1F	98	117.9	25.4			31	30.1	22
C	99		132.3	157.7	0.16			
2F	7700	117.9	53.8			29.5	30.1	29
C	1		117.6	171.4	0.31			
3F	4	117.9	24.3			28	30.1	13
C	5		146.5	170.8	0.14			
4F	8	117.9	29.7			26.6	30.3	19
C	9		129.2	158.9	0.19			
5F	12	117.9	76.8			25.2	30.3	36
C	13		90.5	167.3	0.46			
6F	16	117.9	128.2			23.5	30.5	31
C	17		41.4	169.6	0.76			
7F	20	117.9	114.5			22	30.1	24
C	21		56.6	171.1	0.67			
8F	24	117.9	128.6			20.5	30.4	34
C	25		70.5	199.1	0.65			

F = fine; C = coarse fractions

Station locations provided by X & Y coordinates.

a and b samples are replicates 0-2 cm surface sections at station from different Shipek grab samples.

Appendix D

**Description of Bikini Lagoon Surface Sediments (0–4 cm)
Collected During 4–6/1979**

Appendix D. Description of Bikini lagoon sediments (0–4 cm surface sections) collected during 4–6/1979.

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
4/22/79-3F	7406	102.07	60.12			32.5	31.5	49
C	7		51.72	111.84	0.54			
4F	10	102.07	57.88			32.5	33	38
C	11		78.87	136.75	0.42			
5F	14	102.07	34.27			32.5	34.5	31
C	15		58.27	92.54	0.37			
10F	26	102.07	21.48			26.5	37.5	49
C	27		83.09	104.57	0.21			
11F	30	102.07	3.27			26.5	36	49
C	31		48.81	52.08	0.06			
12F	34	102.07	5.03			28	36	51
C	35		55.43	60.46	0.08			
13F	38	102.07	2.88			29.5	36	45
C	39		46.14	49.02	0.06			
4/23/79-1F	44	102.07	57.46			29.5	34.5	54
C	45		88.22	145.68	0.39			
2F	48	102.07	28.14			29.5	33	56
C	49		68.72	96.86	0.29			
3F	52	102.07	71.69			29.5	31.5	44
C	53		77.09	148.78	0.48			
4/24/79-1F	56	102.07	69.28			26.5	31.5	42
C	57		67.4	136.68	0.51			
2Fa	60	102.07	40.54			26.5	33	52–54
C	61		63.2	103.74	0.39			
2Fb	64	102.07	11.78					
C	65		57.09	68.87	0.17			
3Fa	68	102.07	5.41			26.5	34.5	52–53
C	69		48.9	54.31	0.10			
3Fb	72	102.07	1.45					
C	73		48.21	49.66	0.03			
4F	76	102.07	32.42			25	34.5	52
C	77		81.07	113.49	0.29			
5F	80	102.07	2.56			23.5	34.5	54
C	81		52.15	54.71	0.05			
6F	84	102.07	10.33			22	34.5	54
C	85		52.13	62.46	0.17			
7F	88	102.07	4.35			20.5	34.5	47
C	89		50.62	54.97	0.08			
8F	9094	102.07	81.69			19	34.5	49

Appendix D. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
C	9095		67.16	148.85	0.55			
10F	98	102.07	110.32			16	34.5	48
C	99		35.09	145.41	0.76			
11F	7502	102.07	115.04			14.5	34.5	44
C	3		60.83	175.87	0.65			
12F	6	102.07	100.82			14.5	36	40
C	7		31.77	132.59	0.76			
13F	9096	102.07	17.63			16	36	54
C	9097		101.75	119.38	0.15			
15F	14	102.07	107.11			17.5	39	56
C	15		28.92	136.03	0.79			
15bF	16	102.07	89.98					
C	17		50.69	140.67	0.64			
17F	22	102.07	123.18			20.5	39	59
C	23		0.57	123.75	1.00			
4/25/79-2F	30	102.07	47.6			19	37.5	56
C	31		69.26	116.86	0.41			
3F	34	102.07	14.3			19	36	46-52
C	35		89.27	103.57	0.14			
4F	38	102.07	89.67			19	33	51
C	39		48.64	138.31	0.65			
5F	42	102.07	93.62			19	31.5	48
C	43		61.93	155.55	0.60			
6F	46	102.07	99.1			21.25	29.75	31
C	47		47.65	146.75	0.68			
6/15/79-1F	50	102.07	108.46			33.3	30.9	
C	51		3.03	111.49	0.97			
2F	54	102.07	90.14			31	31.5	48
C	55		45.95	136.09	0.66			
3F	58	102.07	74.22			28	31.5	46
C	59		48.56	122.78	0.60			
4F	62	102.07	31.16			25	31.5	44
C	63		81.23	112.39	0.28			
5F	66	102.07	26.05			23.5	31.5	48
C	67		54.15	80.2	0.32			
6F	70	102.07	92.25			22	31.5	44
C	71		50.13	142.38	0.65			
7F	74	102.07	64.07			20.5	31.5	42
C	75		85.49	149.56	0.43			

Appendix D. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
8F	78	102.07	104.65			17.5	31.5	36
C	79		64.1	168.75	0.62			
9F	82	102.07	42.76			16	32.8	32
C	83		85.37	128.13	0.33			
10F	86	102.07	72.1			17.5	32.8	45
C	87		46.65	118.75	0.61			
11F	90	102.07	89.65			20.5	32.8	54
C	91		49.82	139.47	0.64			
12F	94	102.07	56.66			22	32.8	52
C	95		59.12	115.78	0.49			
13F	98	102.07	95.57			23.5	32.8	57
C	99		26.83	122.4	0.78			
14F	7602	102.07	21.47			25	32.8	54
C	3		55.69	77.16	0.28			
15F	6	102.07	50.58			28	32.8	56
C	7		53.77	104.35	0.48			
16F	10	102.07	24.9			28	34.3	59
C	11		52.95	77.85	0.32			
17F	14	102.07	3.55			31	32.8	53
C	15		46.91	50.46	0.07			
18F	18	102.07	19.55			31	34.3	47
C	19		46.78	66.33	0.29			
6/16/79-7F	34	102.07	41.9			17.5	40.2	45
C	35		54.35	96.25	0.44			
9F	40	102.07	93.55			16	39	59
C	41		3.07	96.62	0.97			
10F	44	102.07	102.68			14.5	39	43
C	45		3.92	106.6	0.96			
11F	48	102.07	50.93			14.5	37.8	48
C	49		48.37	99.3	0.51			
12F	52	102.07	28.35			17.5	37.7	57
C	53		65.26	93.61	0.30			
13F	56	102.07	20.06			17.5	36	56
C	57		59.29	79.35	0.25			
14F	60	102.07	15.07			20.5	36	55
C	61		37.08	52.15	0.29			
15F	64	102.07	2.23			22	36	55
C	65		44.81	47.04	0.05			
16F	68	102.07	6.21			23.5	36	58

Appendix D. (Continued).

LogID	MS number	Volume total sample (cm ³)	Dry wt fine and coarse fraction (g)	Total dry sample wt (g)	Fines (fraction of total wt)	Minutes east of 165°E X-coord	Minutes north of 11°N Y-coord	Water depth (m)
C	69		41.52	47.73	0.13			
17F	72	102.07	4.6			25	36	59
C	73		40.37	44.97	0.10			
18F	76	102.07	2.97			25	37.7	57
C	77		47	49.97	0.06			
19F	80	102.07	43.66			23.5	37.7	49
C	81		41.69	85.35	0.51			
20F	84	102.07	5.06			22	37.7	57
C	85		40.25	45.31	0.11			
21F	88	102.07	5.72			20.5	37.7	58
C	89		45.24	50.96	0.11			
22F	92	102.07	71.74			22	39	48
C	93		46.93	118.67	0.60			
23F	96	102.07	73.94			23.5	39	50
C	97		33.57	107.51	0.69			
6/17/79-2F	7702	102.07	54.26			29.5	30.1	29
C	3		75.45	129.71	0.42			
3F	6	102.07	11.96			28	30.1	13
C	7		99.35	111.31	0.11			
4F	10	102.07	29.06			26.6	30.3	19
C	11		84.55	113.61	0.26			
5F	14	102.07	76.76			25.2	30.3	36
C	15		69.54	146.3	0.52			
6F	18	102.07	95.84			23.5	30.5	31
C	19		38.42	134.26	0.71			
7F	22	102.07	26.6			22	30.1	24
C	23		34.61	61.21	0.43			
8F	26	102.07	18.09			20.5	30.4	34
C	27		31.79	49.88	0.36			

F = fine; C = coarse fraction

All sediment subsampled to a depth of 4 cm from Shipek grab sampler.

Station locations provided by X & Y coordinates

a and b samples are replicate 0–4 cm surface sections at station from different Shipek grab samples.

Appendix E

**Concentration of ^{241}Am in Fine and Coarse Fractions in Surface
(0–2.5 cm) Sections of Sediment Samples Collected from Bikini Lagoon
During 10–11/1972**

Appendix E. Concentration of ^{241}Am in fine and coarse fractions in surface (0–2.5 cm) sections of sediment samples collected from Bikini lagoon during 10–11/1972.

Station No.	MSC No.	Fines (fraction of total wt)	^{241}Am Bqkg ⁻¹ dry wt fraction	% error	^{241}Am kBqm ⁻² dry wt fraction	% error	^{241}Am dry Bqkg ⁻¹ total sample	^{241}Am dry kBqm ⁻² total sample	% error
B3	44f		530	3	14.9	3	461	18.0	3
B3	44c	0.72	285	3	3.1	3			
B19	54f		3926	1	16.0	1	1947	34.7	0
B19	54c	0.23	1363	1	18.8	1			
B18	55f		3815	1	38.8	1	2490	67.9	0
B18	55c	0.37	1704	1	29.2	1			
B21	56f		907	2	22.5	2	768	26.1	2
B21	56c	0.73	389	3	3.5	3			
B22	57f		178	2	0.5	2	1020	14.4	0
B22	57c	0.21	1244	1	13.8	1			
B24	58f		1959	3	3.2	3	1015	15.4	1
B24	59c	0.11	900	1	12.2	1			
C11	66f		208	5	3.0	5	176	5.2	4
C11	66c	0.49	145	6	2.2	6			
C8	68f		1252	1	33.6	1	1218	34.9	0
C8	68c	0.94	726	5	1.3	5			
B2	69f		2570	1	69.8	1	2504	73.7	0
B2	69c	0.92	1707	2	3.9	2			
B4	45f		109	6	0.5	6	67	2.2	3
B4	45c	0.14	60	3	1.7	3			
B6	46f		45	6	1.1	6	41	1.5	6
B6	46c	0.67	34	16	0.4	16			
B7	47f		90	4	1.8	4	81	2.7	4
B7	47c	0.58	67	7	1.0	7			
B8	48f		47	7	1.0	7	40	1.5	5
B8	48c	0.54	31	8	0.5	8			
B10	49f		4	100	0.0	100	3	0.0	87
B10	49c	0.12	3	100	0.0	100			
B10	50f		4	100	0.0	100	3	0.1	77
B10	50c	0.24	3	100	0.0	100			
B11	51f		31	8	0.5	8	27	0.9	6
B11	51c	0.47	23	9	0.4	9			
B11	52f		25	10	0.4	10	30	1.0	7
B11	52c	0.46	34	9	0.6	9			
B16	53f		85	4	0.7	4	73	1.6	3
B16	53c	0.36	66	5	0.9	5			
B23	58f		110	3	2.1	3	103	3.6	2
B23	58c	0.54	96	3	1.5	3			
B25	60f		552	2	4.0	2	278	8.2	1

Appendix E. (Continued).

Station No.	MSC No.	Fines (fraction of total wt)	^{241}Am Bqkg ⁻¹ dry wt fraction	% error	^{241}Am kBqm ⁻² dry wt fraction	% error	^{241}Am dry Bqkg ⁻¹ total sample	^{241}Am dry kBqm ⁻² total sample	% error
B25	60c	0.24	190	2	4.3	2			
B26	61f		611	4	0.5	4	357	4.2	2
B26	61c	0.06	340	2	3.8	2			
B15	64f		60	6	0.9	6	64	1.8	5
B15	64c	0.51	68	7	0.9	7			
C6	29f		485	2	2.6	2	930	28.3	0
C6	29c	0.82	1026	1	25.6	1			

F = fine; C = coarse sample

Appendix F

**Concentration of ^{241}Am in Fractions from Core Sections of Sediment from
Bikini, 10–11/1972**

Appendix F. Concentration of ^{241}Am in fractions from core sections of sediment from Bikini, 10–11/1972.

Station number & date collected	Depth increment (cm)	Dry wt fine and coarse fraction (g)	^{241}Am dry wt Bqkg^{-1} fraction	% error	^{241}Am dry wt kBqm^{-2} fraction	% error	^{241}Am dry Bqkg^{-1} total	^{241}Am dry kBqm^{-2} total	% error
B-3 11/8/72	0-5f	111.1	310	2	9.5	2	284	19.0	2
	0-5c	132	263	3	9.6	3			
	5-10f	48.9	411	2	5.5	2	257	11.6	2
	5-10c	115	191	3	6.1	3			
	10-15f	52.7	752	2	10.9	2	385	18.0	2
	10-15c	116.5	220	3	7.0	3			
	15-20f	50.4	581	2	8.1	2	252	10.6	2
	15-20c	102.2	89	5	2.5	5			
	20-25f	53.4	307	3	4.5	3	123	5.5	3
	20-25c	108.5	33	10	1.0	10			
	25-30f	56.3	64	6	1.0	6	23	1.1	12
	25-30c	123.3	4	100	0.1	100			
	30-35f	47.8	59	6	0.8	6	19	0.9	15
30-35c	122.9	4	100	0.1	100				
B-4 11/8/72	0-3	88.6	86	5	2.1	5	185	2.1	5
	3-6	123.3	87	5	3.0	5	185	3.0	5
	6-7	30.3	86	7	0.7	7	259	0.7	7
B-16 11/4/72	0-3	119.9	74	5	2.5	5	185	2.5	5
	3-6	97.3	78	5	2.1	5	185	2.1	5
	6-9	97.7	83	5	2.2	5	185	2.2	5
	9-12	97.2	75	5	2.0	5	185	2.0	5
	12-15	97.2	80	5	2.2	5	185	2.2	5
B-18 11/4/72	0-3	122.1	2722	1	91.5	1	37	91.5	1
	3-6	109.1	3041	1	91.3	1	37	91.3	1
	6-9	121.2	3619	1	120.7	1	37	120.7	1
	9-10.5	61.2	4148	1	69.9	1	37	69.9	1
B-20 11/8/72	0-5f	180.1	2341	2	116.1	2	2223	117.3	2
	0-5c	11.56	396	5	1.3	5			
	5-10f	184.2	1756	2	89.0	2	1680	89.6	2
	5-10c	9.48	210	7	0.5	7			
	10-15f	96.7	271	2	7.2	2	158	7.2	2
	10-15c	69.3	0	100	0.0	100			

Appendix F. (Continued).

Station number & date collected	Depth increment (cm)	Dry wt fine and coarse fraction (g)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total	²⁴¹ Am dry kBqm ⁻² total	% error
B-25 11/5/72	0-3	70.9	648	1	12.6	1	37	12.6	1
	3-6	83.3	1644	1	62.8	1	37	62.8	1
	6-9	90.7	1485	1	61.8	1	37	61.8	1
	9-12	96.7	267	2	11.8	2	74	11.8	2
	12-15	100.1	159	4	7.3	4	148	7.3	4
	15-18	98.4	25	11	1.1	11	407	1.1	11
C-2 11/13/72 Bravo Crater	0-6	86	1541	1	36.5	1	1541	36.5	1
	6-12	154.5	1567	1	66.6	1	1567	66.6	1
	12-18	187.8	1622	1	83.8	1	1622	83.8	1
	18-24	183	1667	1	83.9	1	1667	83.9	1
	24-30	177.4	1544	1	75.4	1	1544	75.4	1
	30-36	192	1570	1	83.0	1	1570	83.0	1
	36-42	187.3	1619	1	83.4	1	1619	83.4	1
	42-48	195	1619	1	86.9	1	1619	86.9	1
	48-54	182	1796	1	90.0	1	1796	90.0	1
	54-60	229.2	1533	1	96.7	1	1533	96.7	1
	60-66	201	1563	1	86.5	1	1563	86.5	1
	66-72	194.8	1622	1	87.0	1	1622	87.0	1
	72-78	191.4	1563	1	82.3	1	1563	82.3	1
	78-84	198.8	1648	1	90.2	1	1648	90.2	1
	84-90	209.8	1711	1	98.8	1	1711	98.8	1
	90-96	215	1644	1	97.3	1	1644	97.3	1
	96-102	217	1585	1	94.7	1	1585	94.7	1
102-108	210	1670	1	96.5	1	1670	96.5	1	
108-114	202	1841	1	102.3	1	1841	102.3	1	
114-120	228	1978	1	124.1	1	1978	124.1	1	
C-3 11/13/72 Bravo Crater	0-6	213	1356	1	79.5	1	1356	79.5	1
	6-12	196.1	1130	1	61.0	1	1130	61.0	1
	12-18	236.2	548	1	35.6	1	548	35.6	1
	18-24	237.2	507	1	33.1	1	507	33.1	1
	24-30	240.1	511	1	33.8	1	511	33.8	1
	30-36	234.6	526	1	34.0	1	526	34.0	1
	36-42	231.8	611	1	39.0	1	611	39.0	1
42-48	237.7	967	1	63.2	1	967	63.2	1	

Appendix F. (Continued).

Station number & date collected	Depth increment (cm)	Dry wt fine and coarse fraction (g)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total	²⁴¹ Am dry kBqm ⁻² total	% error
C-1 11/13/72 Bravo Crater	0-6	249.5	1319	1	90.5	1	1319	90.5	1
	6-12	268.1	1304	1	96.2	1	1304	96.2	1
	12-18	257.4	1448	1	102.6	1	1448	102.6	1
	18-24	250	1359	1	93.5	1	1359	93.5	1
	24-30	264.2	1393	1	101.3	1	1393	101.3	1
	30-36	257.4	1433	1	101.5	1	1433	101.5	1
	36-41	200.5	1026	1	67.8	1	1026	67.8	1
C-11 11/14/72 Zuni Crater	0-6	281	422	3	32.7	3	422	32.7	3
	6-12	259.1	193	7	13.7	7	193	13.7	7
	12-18	257	230	5	16.2	5	230	16.2	5
	18-24	255.6	104	9	7.3	9	104	7.3	9
	24-31	273.5	73	6	6.5	6	73	6.5	6
C-8 11/14/72 Tewa Crater	0-6	190.5	1070	2	56.1	2	1070	56.1	2
	6-12	237.2	1007	2	65.8	2	1007	65.8	2
	12-17.5	231	1148	2	72.9	2	1148	72.9	2
B-15 10/31/72	0-2.5f	44.4	82	3	1.0	3	76	1.8	3
	0-2.5c	39.7	69	7	0.8	7			
	2.5-5.0f	68.8	62	3	1.2	3	56	1.9	3
	2.5-5.0c	57.2	49	7	0.8	7			
	5.0-7.5f	50.5	65	4	0.9	4	51	1.8	4
	5.0-7.5c	79.7	43	7	0.9	7			
	7.5-10.0f	42.7	70	5	0.8	5	53	1.5	4
	7.5-10.0c	62	41	7	0.7	7			
	10.0-12.5f	29.4	86	4	0.7	4	47	1.3	4
10.0-12.5c	70.6	31	7	0.6	7				

All cores: diameter = 6.8 cm; area = 36.32 cm²

f= fine; c = coarse fractions

Appendix G

Concentration of ^{241}Am and $^{241}\text{Am}/^{239+240}\text{Pu}$ Concentration Ratios in Fine and Coarse Fractions from Surface (0–2 cm) Sections of Sediment Samples Collected from Bikini Lagoon During 4–6/1979

Appendix G . Concentration of ^{241}Am and $^{241}\text{Am}/^{239+240}\text{Pu}$ concentration ratios in fine and coarse fractions from surface (0–2 cm) sections of sediment samples collected from Bikini lagoon during 4–6/1979.

Log ID	MS No.	Fines (fraction of total wt)	^{241}Am dry wt Bqkg ⁻¹ fraction	% error	^{241}Am dry wt kBqm ⁻² fraction	% error	^{241}Am dry Bqkg ⁻¹ total sample	^{241}Am dry kBqm ⁻² total sample	% error	$^{241}\text{Am}/^{239+240}\text{Pu}$
4/22/79–1F	7400		38	9	0.71	9	63	1.6	6	
C	7401	0.75	138	8	0.86	8				
2F	2		49	26	0.21	26	46	1.2	8	0.88
C	3	0.18	46	8	0.94	8				
3F	4		95	6	1.02	6	103	2.4	4	
C	5	0.47	111	6	1.35	6				
4F	8		57	9	0.64	9	55	1.5	5	
C	9	0.42	54	6	0.82	6				
5F	12		113	10	0.64	10	119	2.2	6	
C	13	0.30	122	7	1.60	7				
6F	16		45	6	1.11	6	60	1.6	4	0.58
C	17	0.89	180	5	0.53	5				
7F	18		299	11	0.71	11	164	2.0	7	
C	19	0.19	132	9	1.31	9				
9F	22		159	8	1.35	8	142	3.5	5	0.61
C	23	0.34	133	6	2.15	6				
10F	24		265	8	0.91	8	174	3.5	5	
C	25	0.17	155	6	2.60	6				
11F	28		597	15	0.38	15	615	6.1	6	
C	29	0.06	617	6	5.69	6				
12F	32		454	14	0.35	14	454	4.7	5	
C	33	0.08	454	5	4.31	5				
13F	36		623	12	0.84	12	433	5.7	5	
C	37	0.10	411	6	4.90	6				
14F	40		179	6	2.83	6	163	4.4	5	0.31
C	41	0.59	141	11	1.55	11				
4/23/79–1F	42		157	7	1.54	7	142	3.7	5	
C	43	0.38	133	6	2.13	6				
2F	46		419	6	1.65	6	280	4.8	5	0.62
C	47	0.23	239	7	3.12	7				
3F	50		73	8	0.87	8	63	1.9	5	
C	51	0.41	57	7	0.98	7				
4/24/79–1F	54		61	6	0.68	6	56	1.5	5	0.55
C	55	0.42	53	7	0.84	7				
2Fa	58		396	9	0.71	9	246	3.5	5	
C	59	0.13	225	6	2.82	6				

Appendix G . (Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	²⁴¹ Am/ ²³⁹⁺²⁴⁰ Pu
2Fb	62		736	5	3.36	5	479	8.2	5	
C	63	0.27	385	7	4.82	7				
3Fa	66		620	11	0.39	11	281	2.8	7	
C	67	0.06	259	8	2.44	8				
3Fb	70		629	21	0.22	21	572	5.6	7	
C	71	0.04	570	7	5.41	7				
4F	74		291	13	1.29	13	295	6.0	5	
C	75	0.22	296	6	4.75	6				
5F	78		822	15	0.27	15	503	5.4	6	
C	79	0.03	493	6	5.11	6				
6F	82		1329	9	1.85	9	638	6.9	5	
C	83	0.13	536	6	5.08	6				
7F	86		1149	6	1.40	6	533	6.0	5	
C	87	0.11	458	6	4.63	6				
8F	90		240	9	3.34	9	179	5.0	6	
C	91	0.50	117	5	1.61	5				
9Fb	94		548	6	9.50	6	452	12.3	5	0.65
C	95	0.64	282	5	2.77	5				
10F	96		304	10	7.48	10	284	9.1	8	
C	97	0.77	220	6	1.66	6				
11F	7500		323	75	6.21	75	288	8.5	55	
C	1	0.65	224	8	2.33	8				
12F	4		812	11	17.29	11	786	22.5	9	0.72
C	5	0.74	711	5	5.19	5				
13F	8		1024	6	4.64	6	441	8.4	4	
C	9	0.24	258	6	3.73	6				
14F	10		481	68	5.22	68	382	9.4	38	
C	11	0.44	304	9	4.20	9				
15F	12		7970	9	157.38	9	6555	165.0	9	
C	13	0.78	1407	16	7.64	16				
17F	20		2955	10	72.78	10	2955	73.1	10	0.90
C	21	1.00	3007	7	0.36	7				
4/25/79-1F	24		5041	9	48.31	9	3359	62.2	8	
C	25	0.52	1556	14	13.91	14				
2F	28		2237	5	15.75	5	1310	25.3	4	
C	29	0.36	778	6	9.54	6				
3F	32		795	12	1.93	12	447	8.7	5	
C	33	0.13	397	6	6.73	6				

Appendix G .(Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	²⁴¹ Am/ ²³⁹⁺²⁴⁰ Pu
4F	36		189	6	3.42	6	173	5.0	5	
C	37	0.62	146	6	1.62	6				
5F	40		69	9	1.33	9	67	2.0	6	
C	41	0.63	63	6	0.71	6				
6F	44		49	14	0.85	14	40	1.2	11	
C	45	0.59	28	11	0.33	11				
6/15/79-IF	48		39	8	1.01	8	39	1.1	8	
C	49	0.96	37	25	0.04	25				
2F	52		111	7	1.90	7	113	2.9	5	
C	53	0.65	115	8	1.04	8				
3F	56		66	9	0.98	9	75	2.0	5	
C	57	0.57	86	6	0.97	6				
4F	60		119	9	1.34	9	111	3.0	6	
C	61	0.42	105	7	1.63	7				
5F	64		317	6	0.60	6	235	3.3	6	
C	65	0.13	222	7	2.69	7				
6F	68		131	6	2.54	6	119	4.8	5	
C	69	0.48	107	7	2.25	7				
7F	72		69	11	0.72	11	59	1.6	7	
C	73	0.38	53	9	0.89	9				
8F	76		68	6	1.28	6	59	1.7	5	
C	77	0.67	40	8	0.37	8				
9F	80		44	17	0.38	17	34	0.9	9	
C	81	0.33	29	8	0.51	8				
10F	84		176	9	3.01	9	137	4.0	7	
C	85	0.59	82	5	0.99	5				
11F	88		160	10	2.60	10	152	3.8	7	0.40
C	89	0.64	137	7	1.24	7				
12F	92		100	14	0.99	14	105	2.3	7	
C	93	0.45	109	7	1.29	7				
13F	96		197	16	3.51	16	173	4.7	12	
C	97	0.66	128	6	1.19	6				
14F	7600		336	8	1.47	8	275	4.9	5	
C	1	0.24	255	7	3.45	7				
15F	4		211	6	2.99	6	170	4.3	4	0.54
C	5	0.56	117	5	1.32	5				
16F	8		1097	7	2.09	7	615	9.5	5	0.71
C	9	0.12	547	6	7.36	6				

Appendix G .(Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	²⁴¹ Am/ ²³⁹⁺²⁴⁰ Pu
17F	12		115	100	0.10	100	230	2.4	7	
C	13	0.08	241	6	2.34	6				
18F	16		385	14	0.28	14	288	3.3	13	
C	17	0.06	281	14	2.99	14				
6/16/79-1F	20		283	7	1.91	7	234	4.1	5	
C	21	0.39	202	6	2.16	6				
2F	22		4193	8	95.69	8	3950	99.7	8	0.87
C	23	0.90	1659	7	4.01	7				
3F	24		1799	5	26.23	5	1597	32.8	4	
C	25	0.71	1104	7	6.60	7				
4F	26		3037	9	34.77	9	2081	47.5	7	
C	27	0.50	1117	8	12.68	8				
5F	28		3944	6	29.91	6	2493	40.4	5	
C	29	0.47	1214	7	10.44	7				
6F	30		613	6	13.06	6	583	14.5	5	
C	31	0.86	406	10	1.47	10				
7F	32		3556	5	33.93	5	2267	48.9	4	
C	33	0.44	1245	6	14.99	6				
8F	36		7589	6	186.73	6	7603	187.7	6	0.75
C	37	1.00	12185	7	0.93	7				
9F	38		3426	6	80.11	6	3397	80.9	6	0.84
C	39	0.98	1811	5	0.78	5				
10F	42		1029	8	23.16	8	1019	24.3	8	
C	43	0.95	857	6	1.11	6				
11F	46		1894	12	19.76	12	1238	29.0	8	
C	47	0.45	710	7	9.21	7				
12F	50		4426	6	17.01	6	2049	35.6	5	0.80
C	51	0.22	1374	7	18.61	7				
13F	54		736	11	4.04	11	705	12.0	5	0.64
C	55	0.32	691	5	7.96	5				
14F	58		1055	14	1.02	14	81	1.0	14	
C	59	0.08								
15F	62		999	8	0.53	8	1029	9.5	6	
C	63	0.06	1031	6	8.94	6				
16F	66		904	8	0.84	8	552	6.3	8	
C	67	0.08	521	9	5.44	9				
17F	70		1326	9	2.07	9	867	10.0	5	
C	71	0.13	795	6	7.95	6				

Appendix G .(Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	²⁴¹ Am/ ²³⁹⁺²⁴⁰ Pu
18F	74		5115	5	4.69	5	1787	17.1	5	1.00
C	75	0.10	1434	7	12.41	7				
19F	78		2984	5	17.72	5	1612	25.4	4	
C	79	0.38	782	5	7.67	5				
20F	82		3289	11	3.01	11	1403	14.6	5	
C	83	0.09	1221	5	11.60	5				
21F	86		3559	7	6.64	7	1439	20.2	4	
C	87	0.13	1113	5	13.52	5				
22F	90		3756	5	38.54	5	2354	50.2	4	
C	91	0.48	1052	5	11.62	5				
23F	94		4189	5	61.54	5	2786	76.1	4	
C	95	0.54	1153	9	14.56	9				
6/17/79-1F	98		34	36	0.14	36	45	1.2	10	
C	99	0.16	48	10	1.07	10				
2F	7700		19	30	0.18	30	31	0.9	11	0.70
C	1	0.31	36	11	0.72	11				
3F	4		16	100	0.07	100	24	0.7	13	
C	5	0.14	25	9	0.62	9				
4F	8		25	23	0.12	23	25	0.7	9	
C	9	0.19	25	10	0.55	10				
5F	12		33	8	0.43	8	21	0.6	7	
C	13	0.46	11	14	0.17	14				
6F	16		40	7	0.86	7	39	1.1	6	
C	17	0.76	38	9	0.27	9				
7F	20		29	7	0.56	7	38	1.1	6	
C	21	0.67	56	11	0.54	11				
8F	24		26	18	0.56	18	25	0.9	12	
C	25	0.65	25	10	0.30	10				
mean ²⁴¹ Am/ ²³⁹⁺²⁴⁰ Pu 0.69 ± 0.17										

F=fines; C=coarse fraction

Appendix H

**Concentration of ^{241}Am in Fine and Coarse Fractions from Surface
(0–4 cm) Sections of Sediment Samples Collected from Bikini Lagoon
During 4–6/1979 and Ratio of Inventory in 0–4 cm Section to Inventory in
0–2 cm Section**

Appendix H. Concentration of ^{241}Am in fine and coarse fractions from surface (0–4 cm) sections of sediment samples collected from Bikini lagoon during 4–6/1979 and ratio of inventory in 0–4 cm section to inventory in 0–2 cm section .

Log ID	MS No.	Fines (fraction of total wt)	^{241}Am dry wt Bqkg^{-1} fraction	% error	^{241}Am dry wt kBqm^{-2} fraction	% error	^{241}Am dry Bqkg^{-1} total sample	^{241}Am dry kBqm^{-2} total sample	% error	Inventory ratio 0–4 cm/ 0–2cm depth
4/22/79–3F	7406		94	6	2.2	6	83	3.6	9	1.5
C	7	0.54	70	11	1.4	11				
4F	10		45	11	1.0	11	48	2.6	9	1.7
C	11	0.42	51	8	1.6	8				
5F	14		151	6	2.0	6	172	6.2	7	2.8
C	15	0.37	184	7	4.2	7				
10F	26		291	17	2.4	17	187	7.7	9	2.2
C	27	0.21	160	6	5.2	6				
11F	30		718	10	0.9	10	587	12.0	6	2.0
C	31	0.06	578	6	11.1	6				
12F	34		512	6	1.0	6	493	11.7	6	2.5
C	35	0.08	491	6	10.7	6				
13F	38		178	31	0.2	31	368	7.1	9	1.2
C	39	0.06	380	5	6.9	5				
4/23/79–1F	44		139	15	3.1	15	104	5.9	10	1.6
C	45	0.39	81	5	2.8	5				
2F	48		247	13	2.7	13	319	12.1	8	2.5
C	49	0.29	349	5	9.4	5				
3F	52		74	7	2.1	7	65	3.8	7	2.0
C	53	0.48	58	7	1.7	7				
4/24/79–1F	56		53	7	1.5	7	52	2.8	7	1.8
C	57	0.51	50	7	1.3	7				
2Fa	60		437	8	6.9	8	307	12.5	6	3.6
C	61	0.39	224	5	5.5	5				
2Fb	64		1077	5	5.0	5	598	16.2	6	2.0
C	65	0.17	500	6	11.2	6				
3Fa	68		1955	6	4.1	6	706	15.0	6	5.4
C	69	0.10	567	6	10.9	6				
3Fb	72		608	43	0.3	43	433	8.4	8	1.5
C	73	0.03	427	4	8.1	4				
4F	76		287	8	3.6	8	209	9.3	5	1.6
C	77	0.29	178	4	5.7	4				
5F	80		596	10	0.6	10	545	11.7	6	2.2
C	81	0.05	543	6	11.1	6				
6F	84		1289	6	5.2	6	744	18.2	6	2.6
C	85	0.17	636	6	13.0	6				

Appendix H. (Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	Inventory ratio 0–4 cm/0–2 cm depth
7F	88		863	16	1.5	16	557	12.0	7	2.0
C	89	0.08	531	5	10.5	5				
8F	9094		264	8	8.5	8	293	17.1	7	3.4
C	9095	0.55	327	5	8.6	5				
10F	98		348	11	15.1	11	315	17.9	10	2.0
C	99	0.76	208	6	2.9	6				
11F	7502		330	6	14.9	6	291	20.1	6	2.4
C	3	0.65	217	7	5.2	7				
12F	6		951	5	37.6	5	915	47.5	6	2.1
C	7	0.76	799	7	10.0	7				
13F	9096		918	12	6.3	12	354	16.5	10	2.0
C	9097	0.15	256	9	10.2	9				
15F	14		9081	7	381.2	7	7443	396.8	7	2.4
C	15	0.79	1377	8	15.6	8				
15bF	16		10104	7	356.3	7	7149	394.1	6	
C	17	0.64	1905	5	37.8	5				
17F	22		3110	9	150.1	9	3112	150.9	9	2.1
C	23	1.00	3648	8	0.8	8				
4/25/79–2F	30		1920	14	35.8	14	974	44.6	10	1.8
C	31	0.41	324	7	8.8	7				
3F	34		1281	6	7.2	6	463	18.8	6	2.2
C	35	0.14	332	6	11.6	6				
4F	38		174	7	6.1	7	148	8.0	7	1.6
C	39	0.65	100	7	1.9	7				
5F	42		65	12	2.4	12	76	4.6	12	2.3
C	43	0.60	92	11	2.2	11				
6F	46		53	11	2.1	11	73	4.2	10	3.5
C	47	0.68	114	8	2.1	8				
6/15/79–IF	50		37	8	1.6	8	36	1.6	8	1.4
C	51	0.97	16		0.0					
2F	54		84	10	3.0	10	87	4.6	10	1.6
C	55	0.66	92	11	1.7	11				
3F	58		90	6	2.6	6	87	4.2	6	2.1
C	59	0.60	81	6	1.6	6				
4F	62		105	7	1.3	7	88	3.9	6	1.3
C	63	0.28	81	6	2.6	6				
5F	66		274	10	2.8	10	980	30.8	7	9.3
C	67	0.32	1319	4	28.0	4				
6F	70		109	8	4.0	8	101	5.6	8	1.2
C	71	0.65	85	8	1.7	8				
7F	74		69	11	1.7	11	50	2.9	9	1.8
C	75	0.43	36	7	1.2	7				
9F	82		36	31	0.6	31	30	1.5	20	1.7
C	83	0.33	27	10	0.9	10				
10F	86		177	7	5.0	7	158	7.3	7	1.8

Appendix H. (Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	Inventory ratio 0–4 cm/0–2 cm depth
C	87	0.61	128	6	2.3	6				
11F	90		142	8	5.0	8	134	7.4	8	1.9
C	91	0.64	121	7	2.4	7				
12F	94		181	6	4.0	6	214	9.7	6	4.2
C	95	0.49	246	6	5.7	6				
13F	98		161	11	6.0	11	158	7.6	10	1.6
C	99	0.78	147	6	1.5	6				
14F	7602		305	12	2.6	12	272	8.2	9	1.7
C	3	0.28	260	7	5.7	7				
15F	6		227	10	4.5	10	221	9.0	8	2.1
C	7	0.48	214	5	4.5	5				
16F	10		833	5	8.1	5	658	20.1	6	2.1
C	11	0.32	576	6	11.9	6				
17F	14		200	29	0.3	29	197	3.9	10	1.6
C	15	0.07	196	7	3.6	7				
18F	18		867	8	6.6	8	473	12.3	7	3.7
C	19	0.29	308	7	5.6	7				
6/16/79–7F	34		4593	5	75.4	5	2643	99.7	10	2.0
C	35	0.44	1141	13	24.3	13				
9F	40		3362	8	123.2	8	3317	125.6	8	1.6
C	41	0.97	1947	8	2.3	8				
10F	44		1269	5	51.1	5	1266	52.9	5	2.2
C	45	0.96	1201	8	1.8	8				
11F	48		1750	11	34.9	11	1245	48.4	9	1.7
C	49	0.51	713	6	13.5	6				
12F	52		4237	7	47.1	7	1857	68.1	6	1.9
C	53	0.30	823	6	21.1	6				
13F	56		1053	8	8.3	8	716	22.3	7	1.9
C	57	0.25	601	7	14.0	7				
14F	60		2134	11	12.6	11	918	18.8	7	
C	61	0.29	423	4	6.1	4				
15F	64		0		0.0		800	14.7	6	1.5
C	65	0.05	840	6	14.7	6				
16F	68		856	6	2.1	6	600	11.2	7	1.8
C	69	0.13	561	7	9.1	7				
17F	72		1109	7	2.0	7	860	15.2	6	1.5
C	73	0.10	832	6	13.2	6				
18F	76		4330	9	5.0	9	1660	32.5	5	1.9
C	77	0.06	1491	5	27.5	5				
19F	80		2672	8	45.7	8	1934	64.7	10	2.5
C	81	0.51	1161	11	19.0	11				
20F	84		4452	6	8.8	6	1792	31.8	8	2.2
C	85	0.11	1457	8	23.0	8				
21F	88		2688	5	6.0	5	1185	23.7	6	1.2
C	89	0.11	994	6	17.6	6				

Appendix H. (Continued).

Log ID	MS No.	Fines (fraction of total wt)	²⁴¹ Am dry wt Bqkg ⁻¹ fraction	% error	²⁴¹ Am dry wt kBqm ⁻² fraction	% error	²⁴¹ Am dry Bqkg ⁻¹ total sample	²⁴¹ Am dry kBqm ⁻² total sample	% error	Inventory ratio 0–4 cm/0–2cm depth
22F	92		3770	5	106.0	5	2770	128.8	5	2.6
C	93	0.60	1241	5	22.8	5				
23F	96		4767	6	138.1	6	3695	155.7	6	2.0
C	97	0.69	1333	5	17.5	5				
6/17/79–2F	7702		20	22	0.4	22	18	0.9	17	1.0
C	3	0.42	16	12	0.5	12				
3F	6		26		0.1		27	1.2	9	1.7
C	7	0.11	27	9	1.1	9				
4F	10		32	26	0.4	26	30	1.3	18	1.9
C	11	0.26	29	14	1.0	14				
5F	14		30	9	0.9	9	26	1.5	11	2.5
C	15	0.52	21	12	0.6	12				
6F	18		45	8	1.7	8	40	2.1	9	1.9
C	19	0.71	26	11	0.4	11				
7F	22		141	12	1.5	12	96	2.3	10	2.1
C	23	0.43	62	8	0.8	8				
8F	26		167	12	1.2	12	72	1.4	31	1.6
C	27	0.36	18	38	0.2	38				
								mean		2.2 ± 1.2
								median		2.0

F = fines; C = coarse fraction

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