HEADQUARTERS JOINT TASK FORCE SEVEN APO 187 (HOW) c/o POSTMASTER SAN FRANCISCO, CALIFORNIA

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TO:

18 March 1954

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SUBJECT: Radiological Surveys of Several Marshall Island Atolls

Distribution

1. Attached herewith for your information and retention are copies of radiological surveys made on certain Marshall Island Atolls. The surveys were conducted as a result of contamination deposited on the affected atolls by BRAVO Shot, Operation CASTLE, fired from a reef approximately one and or half nautical miles southwest of Namu, Bikini Atoll. BRAVO Shot time was 1845 Zebra, 28 February 1954.

2. Water and soil samples were shipped to the Health and Safety Laboratory, New York Operations Office, Atomic Energy Commission (Attention: Mr. Merrill Eisenbud) for analysis.

FOR THE COMMANDER:

DISTRIBUTION: CTG 7.1 - Cupy 1-30 E. McGINLEY CTG 7.2 - Copy 31 Brigadier General, U.S. Army Chief of Staff 326 US ATCHIC ENERGY 0 CTG 7.3 - Copy 32 $\frac{1}{1} \frac{1}{9} \frac{1}$ CTG 7.4 - Copy 33 B-1 CTG 7.5 - Copy 34 Location CINCPAC - Copy 35 Collection Records Center CINCPACELT - Copy 36 HICOMTERPACIS Folder CASTLE FALLOUT - Copy 37 COLINAVSTAKWAJ - Copy 38 CBSERVATIONS DW:/VEC - Copy 39 DEA/AEC - Copy 40 CONFIRMED TO BE UNCLASSIFIED Ch AFSWP - Copy 41 BY AUTHORITY OF DOE OG CG FldComd(DWET) - Copy 42 C/S USA, ExAgt - Copy 43 NEV/EWED BY LASL H Div. - Copy 44 HISL, NYOO (c/o Mgr Opns) - Copy 45-46 USS RENSHAW (DDE-499) - Copy 47 USS PHILIP (DDE-498) - Copy 48 USS NICHOL'S (DDE-449) - Copy 49 3 Incls: 1. Report on Soil and Water Sampling Mission by Major R. D. Crea COPIED/DOE 2. Report on Soil and Water Sampling Mission by Dr. T. N. White, LASL IANL RC 3. Rad. Survey of Downwind Atalla Conteminated. by BRAVO by Dr. Herbert Schulle 5RD-213.54E

HEADQUARTERS JOINT TASK FORCE SEVEN APO 187 (HOW) c/o POSTMASTER SAN FRANCISCO, CALIFORNIA

COLIPT

8 March 1954

of ppf or provide is SUBJECT: Report on Soil and Water Sampling Mission

TO:

Commander Joint Task Force SEVEN APO 187 (HOW) c/o Postmaster San Francisco, California

1. In compliance with your oral instructions, the undersigned visited LIK1 . and AILUK Atolls, JEMO Island and MEJIT Island in the Eastern Marshalls between the period 5-8 March 1954 for the purpose of collecting soil and water samples and measuring level of gamma radiation present at those places in connection with BRAVO. The mission, consisting of the undersigned and a Marshallese interpreter, Lan Lakapun, embarked on the USS BENSHAM (DDE499) at Kwajalein, visited the four sites and returned to Bikini, where the remainder of the trip to Eniwetok was per formed by PBM. There follows a detailed discussion of the findings at each location:

LIKIEP ATOLL. The samples were taken on Likiep Island, which had the a. largest native population. Access to the lagoon was gained through South Pass. Poor light at the end of the day and numerous coral heads necessitated anchoring about 4 miles from Likiep Island. Trip in was made by whaleboat the following morning. A water sample was taken from a large cistern fed from the roof of the Catholic rectory, and earth samples were taken from random spots about the island which were unsheltered by trees or other growth at approximately 0800 M 6, March 1954. Radiation readings were take with a MX-5 instrument between 0800 M and 0900 M and showed a maximum of 3 milliroentgens per hour. No variations from this reading were noted on clothing or bare feet of individuals. According to accounts received by Bishop Feeney, S.J., the population was greatly excited by the light and blast wave, the latter which reportedly arrived about 30 minutes subsequent to the light flare. According to Bishop Feeney, church attendance was greatly stimulated on the day of the test.

b. JEMO Island. This location was reached at 1100 M, 6 March 1954. It consists of a small heavily wooded island, surrounded by a line coral reef with heavy surf on three sides. There being no place for landing a whaleboat, personned and equipment were transferred from the whaleboat to the reef by a one man rubber raft. The undersigned transferred himself by swimming. The island proved to be uninhabited, and reportedly is a sea turtle preserve. Turtle hunters erected COPIED/DOE several houses, a rain barrel of which provided a water sample. Earth samples were gathered at random from open areas, including one of beach sand above the high tide mark. The party was led straight across the island and back to the landing area via the beach, in order to verify its uninhabited state. Samples were



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collected at approximately 1200 M, 6 March 1954. Instrument readings with the MX-5 showed a maximum of 3 mr/hr, however this was not considered reliable, since a higher scale showed a lower reading.

c. <u>AILWK ATOLL</u>. The ship reached this atoll at approximitely 1600 M, 6 March 1954, and slowly moved to an anchorage off Ailuk Island, the most heavily populated. The lagoon has not been swept, and numerous coral heads and pinnacles provided considerable hazard to ship movement. The landing party moved ashore by whaleboat without difficulty, and again obtained water samples from the most prominent cistern and soil samples from random unsheltered spots. Readings with the MXshowed approximately 3 mr/hr (off the 2 mr scale). An AN/PDR-27E showed a high reading of 7 mr/hr, however, on a different scale a reading of 12 or 15 mr/hr was obtained. The MX-5 reading is probably nearest correct. No significant variations were detected on bare fect or clothing of individuals. Samples and readings were taken at approximately 1700 M, 6 March 1954.

d. <u>MEJIT Island</u>. This single coral island is also surrounded by a recf, as is JEMO, but landing was possible with a whaleboat, due to an area protected frothe surf. The island was found to be heavily populated in view of its size, the total number of people being 327, according to the island magistrate. Soil and water samples were taken as in the previously described manner, at approximately 1300 M, 7 March 1954. Readings with the MX-5 showed maximum of approximately 3 mr/hr (off the 2 scale, but approximately 1.5 on the 20 scale); the maximum reading with a PDR 27 E was 10 mr/hr. The true figure was probably somewhere between the two.

2. <u>CONCLUSIONS</u>. Low level (less than 10 mr/hr) radiation measurements with field instruments of the type used are highly unsatisfactory. One MX-5 and three AK/PDE 27 E instruments all showed widely variant readings on different scales, and varied among each other when exposed to the same radiation. An AN/PDE T1-B proved completely useless not holding to zero even after an hours warm-up, and also showing widely variant readings on different scales.

3. <u>RECOMMENDATIONS</u>. Landing parties in islands such as JEMO and MEJIT should be provided with a rubber 6-man or 8-man pneumatic boat, to provide greater safety to personnel and equipment. This will permit landing directly on live coral reefs with less danger of the boat being stove in. Ships assigned to such missions should draw such equipment prior to departure.

4. The successful accomplishment of the mission was greatly facilitated by the interest and enthusiasm of the Commanding Officer of the USS RENSHAW, CDR L. H. Alford, USN, and his officers and men. Their material contributions were necessary to the mission, however, the many valuable suggestions and assistance in solutions of problems proved invaluable.

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/s/ R. D. Crea R. D. CREA MAJ, USA 2 THE REAL PROPERTY AND INCOMENT





MELIORANDUM FOR: CJTF SEVEN

10 March 1954

SUBJECT: Report on Soil and Water Sampling Mission

1. In compliance with your oral instructions, the undersigned visited Wotje, Erikub, Maloelap, Wotho, Majuro Atolls in the Marshall Islands 5 through 7 March 1954 for the purpose of obtaining earth and drinking water samples, and of measuring gamma ray dose rates, and also checked the radiological condition of the S.S. ROQUE on its arrival at Majuro 7 March 1954.

2. The first four atolls were visited by Marshallese interpreter Takushi and the writer by means of an UF-1 amphibious aircraft. Majuro was reached by C-47. Erikub might have been omitted since it was not inhabited, being property of the Wotje tribe which goes there only occasionally to gather copra. (This was unknown until after the visit.)

3. At each atoll, only the principal inhabited island was visited. At each visited island an effort was made to compose a representative soil average by collecting into a single container several samples, each approximately one square foot of area and one inch depth. Water samples were collected from the princip sources currently in use. The gamma dose rates are averages for the inhabited areas.

4. With regard to certain minor discrepancies between the survey methods us by Major R. D. Grea and the writer; it was originally planned to perform the survjointly, and when it became advisable to separate and survey different atolls, no time remained for discussion of details of techniques.

5. Gamma-ray dose rates on Wotje and on Erikub are each the average of MX-5 and $\Lambda N/PDR-39$ average readings which agreed reasonably well. The MX-5 was render inoperative when the rubber life raft was swamped by surf on the first attempt to launch from the beach at Erikub. Following the Wotho survey, the PDR-39 developed a temperature-dependent reading of 0.4 - 2 mr/hr, so that later readings in this range are of very dubious reliability.

6. The following tabulation summarizes the atoll survey. S is Soil, W is Water Sample:

ATCIL	ISLAND	DATE	THE	SAMPLE NO	MR/HR & S. MPLING
WOTJE	ORMED	5 Mar	1600	S5	3.5 mr/hr, 1-beach, 3-mid-vill.
				W6	2 well plus 2 catch basin.
ERIKUB	ERIKUB	5 Mar	1715	56	1.5 mr/hr. 1-mid-village, 1 on path to boach. No inhabit- ants, no water supply found.

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ATOLL	ISLAND	DATE	TIME	SAMPLE NO	MR/HR & SALIPLING
MALOELAP	KA VEN	6 Mar	1130	57 W12	1.8 m/hr, 2-villago, 2-path to beach. Well water.
				W13	From catch basin.
!*OTHO	WOTHO	6 Mar	1615	S8	0.8 mr/hr, 1 by well; 2-mid- villago.
				W9	Well water (no rain in catch basin for 2 mo_{\bullet})
MAJURO	ULIGA	7 Lar	1200	S9	0.5 mr/hr, 4 from near Admin Bldg.
				WIO	Tap water.

7. Pacific Micronesian Line S.S. "ROQUE", Master: Lawrence Blanc, home port, Guam, left Eboye 0840 M on 1 March, entered channel to Utirik Lagoon about 1200 K on 2 March, and anchored in Lagoon at 1524 M on 2 March; docked at Majuro (Uliga Is.) 1630M on 7 March. Readings (mr/hr) after docking: 2-3 inside main dock structure, 10 on open deck, 5-8 in sleeping quarters on upper deck, 10-30 cn rope and canvas. Prior radiation levels cannot be estimated because of rain squalls and un certainty about when decks last washed. Laster wis advised to have decks washed down as soon as convenient. He was told that the activity would not hurt anyone, but that it was undesirable to have it around longer than necessary.

8. <u>RECOMMENDATIONS</u>: Future visits to Erikub and Maloelap should not be attempted by UF-1 except under conditions of greater urgency. The writer's prior experience in such operations is very limited, but from his own observations plus the remarks made by those better qualified to judge, it appears that a fair amount of risk is involved.

9. Especially notable was the very cooperative attitude of the Navy personne at Kwajalein and the Marshall District Administrative Officials at Majuro in supporting this mission.

1 Incl: Marshall Islands Atoll Samples collected by T. N. White, 5-7 March 1954 /s/ T. N. White DR. T. N. WHITE Health Division LASL

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Earth samples were collected as follows:

At each island visited several samples were dug and put into the same one-gallon "ice-cream carton". Each sample (i.e. each digging) approximated onesquare foot to a depth of one inch. The number and locations of the samples were selected to represent, as well as could be judged, an average of the areas used by the inhabitants, after the samples were mixed in the carton. Areas that were unusually shaded or unshaded by trees were avoided. The largo "pebbles" in the composite represent coral gravel from "main street" through the village.

Water samples were selected according to the principal source in current $u \rightarrow c$

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TU-13-54-375

12 March 1954

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SUBJECT: Radiological Survey of Downwind Atolls Contaminated by BRAVO

1. Acknowledgement

The members of the survey team wish to express their appreciation to the Captain, officers and members of the crew of the USS NICHOLAS (DDE 449) for their assistance and cooperation in conducting the survey herein reported. Captain Elliet turned over all possible facilities of his ship in order to assist in the survey. LT Frink, the Executive Officer, organized all the operations of the beat parties, and it was only through his personal direction and participation that it was possible to carry out the small beat surveys under extremely difficu ecnditions. Since most of the lagoon waters were not navigable by a DDE, it was necessary to make long beat trips in high seas and land on tricky coral reefs. That it was possible to make, without mishap, a detailed survey of five widely separated atells in the course of three days with only two beats was largely due to his efforts.

2. Introduction

The BRAVO Shot contaminated a number of atolls in generally eastward direction from Bikini to such an extent that it became necessary to ovacuate the native populations from Rongelap, Alinginae and Utirik Atolls and the military personnel on Rongerik Atoll. Following this evacuation CJTF SEVEN organized the subject detailed radiological survey of the atolls to the eastward of Bikini (Ref. CJTF SEVEN Eniwetok 0604002). The data from this survey were required for the following purposes:

- a. The evaluation of the radiation effects on evacuces.
- b. The estimation of the clapsed time before reoccupancy.

c. The estimation of the residual radiation effects of large yields surface detonations.

In connection with this survey, teams from various Task Groups and Mr. Wilds, Trust Territory Representative, returned to the atolls to secure the evacuated habitations, service military equipment, and obtain documentary photography.

COPIED/DOE 3. Operational Schedule LANL RC Survey team rendezvous aboard USS NICHOLAS (DDE 449) 8 March - 0800 in Rongelap Legoon. 44 85 B

SUBJECT: Radiological Survey of Downwind Atolls Contaminated by BRAVO

- 8 March 1000 1800 Two parties in small boats surveyed living areas on Rongelap Island and eastern half of Rongelap Atoll.
- 9 March 0700 1130 Two parties in small boats proceeded from the DD. which was stationed outside Utirik Atoll and surveyed Utirik and Aon Islands, the main islands of the Atoll,
- 9 March 1500 1700 One party in a small boat landed on the outer ---reef of Bikar Island and surveyed the island, the only large island of Bikar Atell.
- 10 March 0700 1100 Two parties in small boats proceeded from the Diwhich was stationed outside Rongerik Atoll and surveya Eniwetak Island (where the Task Force's Units had been stationed) and the other important islands of the Atel
- 10 March 1430 1980 Two parties in small boats proceeded from the DR which was stationed outside Alinginae Atoll and surve; the inhabited islands of the Atoll,
- 11 March 0700 1400 One party in a small boat surveyed the northwest ern islands of Rongelap Atoll and one party rechecked the living areas on Rongelap Island and established a reference location for future decay measurements.
- 12 March 0800 Survey toam arrived Eniwotok Atoll via DDE.

4. The following personnel from test projects in TG 7.1, TU 13, served as members of the survey team:

Herbert Scoville, Jr.	TU-13 Staff
Richard Rast	Project 2.1
Richard Soule	Projoct 2.5a
Valmer Strope	Project 6.4

The USS NICHOLAS (DDE 449) supplied boat crews under the direction of LT Cliffore Frink, Executive Officer, for surveys.

5. Instrumentation

Radiac set AN/PDR-39 was selected as the instrument to be used in the conduct of the survey. Five (5) each of AN/PDR-39 were calibrated with an 80 Curie Co⁶⁰ source twenty-four hours before departure. The calibration yielded a zero variation between instruments - any scale. Upon cross checking three of these instruments, (a point of actual survey) in a radiation field of 0.320 r/t.r it was found that all three instruments gave the same reading.

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These survey meters were subject to prolonged use under adverse conditions of dampness (to the point of sea water splashing over them), salt deposit and continual rough handling. With one exception, all instruments operated efficiently for the duration of the operation. On the final day it was found





SUBJECT: Radiological Survey of Downwind Atolls Contaminated by BRAVO

that one survey meter could not be properly zero adjusted. The four romaining NN/PDR-39, still operated officiently and seemed to be in good working order.

One (1) each Bockman MX-5, and one (1) each /N/PDR-27A was brought along for any low intensity checks necessary. Two (2) each calibrated AN/PDR-TLB, were on hand to serve as spares in the event of operational failure with the /N/PDR-3? None of these instruments were required.

6. The average and maximum gamma doso rates measured on the various islands of each atoll are plotted in Figures 1 through 5. All measurements were made at waist height unless otherwise indicated. The maximum readings do not include measurements made with the instrument next to a contaminated surface.

Dotailed surveys were made of all the inhabited localities. Typical readings are given in Tables 1 and 2 for the native village of Rongelap Island, and the TG 7.4 camp on Eniwetak Island. In general, the villages and the camps appeared to have slightly lower average dose rates than the remainder of the island. This can perhaps be ascribed to different geometry of the contamination and to slightly greater penetration into the loose gravel in the native villages. The dose rates inside the native huts appeared to be almost the same as the dose rate cutside. The dose rate in the middle of the military barracks, tents, and shacks was 1/3 to 1/2 that outside. This reduction is probably largely a geomet effect. The dose rate fell off rapidly on the beach below the high tide mark. There was no evidence of rain washing off the contaminated material. The foilag on the windward sides of the islands appeared to be slightly above average contamination.

TABLE 1

Dosc Rate (mr/hr)

TYPICAL READINGS IN RONGELAP VILLAGE - 8 MARCH

Location

Rongo Cento	clap Island (avorage) or of village	
Ncar	central cistern	
Ncar	southern cistern	
Ncar	northern cistern	

TABLE 2

TYPICAL READINGS IN CAMP ON ENDWETAK IS. - 10 MARCH

	Location	Outside Dose Rate (mr/hr)	Inside Doso Rate (mr/hr)	
COPIED/DOE LANL RC	Eniwetak Island (average) Mess hall Tent, edge of main camp Latrine Sleeping quarters Disponsary	280 220 270 260 260 220	110 175 160 90	
		TATION METISIAL		



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Radio Station 290 Weather Station (N end of island) 280 Proj 6.6.Station (S end of island) 240

In order to estimate the rate of decay between 8 and 11 March, the following radiation measurements were taken on three days on Rongelap Island:

	8 March	11 March
Central living area (village)	280 mr/hr	179 mr/hr
Southern most cistern	220 mr/hr	145 mr/hr
Roof of cistern (Southern most)	240 mr/hr	140 mr/hr
Ground (contact) cistern area	220 mr/hr	110 mr/hr

An area was selected 30 yards inland from the Rongelap cemetery as a mering point for future decay measurements. This area is outlined with 2X4s planner on pails. The waist height reading was 210 mr/hr at 1000 hours, 11 March 1954.

7. Sample collections

<u>Water samples</u> were collected from the water supplies of all inhabited areas. About two quarts of water were transferred to a polyethlene bottle at each site. These will be turned over to the New York Operations Office, AEC for analysis.

Soil samples were collected at all inhabited areas and also at several uninhabited islands. In collecting the soil samples a one foot by one foot square was marked on the ground and soil to about one inch of depth was removed from the square and transferred to a cardboard container. The primary samples will be turned over to the New York Operation Office, AEC, for analysis, and some smaller samples will be analyzed by Program 2 of TU 13.

Listed in Table 3 are the samples taken with the dose rate measured ... at waist height at the location where they were taken.

TABLE 3 - SOIL

Sample No.	<u>Atoll</u>	Island	. Date	<u>Ľr/Hr</u>
1*	Rongelap	Rongelap (North end)	8 Mar	440
2	Rongelap	Rongelap (Center of village)	8 Mar	280
3	Rongelap	Rongelap (1 mile north of village)	8 Har	340
4	Rongelap	Rongelap (near South cistern of village)	8 Lar	220
5*	Rongelap	Eriirippu	8 Mar	2200
6*	Rongelap	Enjaetok	8 Mar	900
7*	Rongelap	Kabelle	8 Mar	2000
8*	Utirik	Utirik	9 llar	40
9	Bikar	Bikar	9 Mar	160
10	Rongerik	Eniwetak	10 Mar	280
11*	Ailinginae	Sifo	10 Mar	100

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*Small additional sample taken for analysis by Program 2 of TU 13.

	-		INEU	No
		THELE 9 MILLIN		
Sample No.	Atoll	Island	Date	<u>Ur/Hr</u>
1	Rongelap	Rongelap (central cistern)	8 Mar	300
2	Rongelap	Rongelap (North part of village)	8 Mar	350
3	Rongelap	Rongelap (Northernmost cistern)	8 Mar	400
4	Rongelap	Rongelap (Southernmost	8 Mar	220
5	Utirik	Utirik (cistern near church)	9 Mar	40
6	Utirik	Utirik (cistern at south of	Q Mar	40
7	Rongerik	Eniwetak (Distillation water)	10 Mar	240

In addition to the above, a sample of foilage was taken at the windward side of Bikar Island. The radiation field was 180 mr/hr on 9 March 1954 at this point.

8. Conclusions and Recommendations

a. The radiological survey proved that a large yield surface detormation can produce extremely serious radiological contamination over a distance more than 120 miles downwind and important contamination about 250 miles down wind.

b. The center of the contamination pattern from the BRAVO Shot lies somewhat north of Rongelap and Rongerik Atolls and probably not far from a libetween Bikini and Bikar.

c. Although the fall-out was serious on Rongelap Island located at the extreme southeast tip of the atoll, the contamination was about ten times greater at the north side of the atoll, twenty miles away.

d. The contamination decreased by a factor of about eight over the downwind distance of 50 miles between Rongelap and Rongerik.

e. Standard military field housing provides a significant degree of protection to personnel inside.

f. The AN/PDR-39 proved to be a very satisfactory instrument for field survey work under rigorous environmental conditions.

g. A single DDE with two (2) whale boats is not a completely satisfactory method of conducting a broad radiological survey of the type just completed. Future surveys should consider using vessels capable of entering more of the atolls and of handling a helicopter and several small boats.

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COPIED /DOE LANL RC	 6 Incls: 1. Ead. Survey Rongelap 2. Rad. Survey Utirik 3. Rad. Survey Bikar 4. Rad. Survey Rongerik 5. Rad. Survey Ailinginae 	/s/ Herbert Scoville DR. HERBERT SCOVILLE Technical Director AFSWP
	6. Summary of Rad. Survey	





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目前目的理论问题目的特别 N ыл UTIRIK ATOLL EERUKKU RADIOLOGICAL SURVEY 9 MARCH AVE READING (MAX. READING) PIGOWAK UTIRIK FASSAGE MR./ HR UTIRIK 30(50) AON IS. 40(66) 5 3 2 N. MILES FIG. 2 27



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BIKAR 12'N Ę. 20 8 ę R 2 Ξ 8 8 õ 70'E Ë UTIRIK S AILUK TAKA .. . OF RADIOLOGICAL SURVEY JENO ALL VALUES ARE RVHR AT RUFERENCE TIME OF ONE HOUR AFTER BURST, EXTRA-CLATED BY MEANS OF T⁻¹⁴ DECAT 1AM. THUSE VALUES DIO HOT ACTUALLY EKUST SINCE TIMES OF ARRIVAL OF COMTANINAMT WERE CONSIDERABLY LATER LIKIEP ·NOTE SUMMARY . 3.05 1081 875 811 UNE SEMISON FIG. 5 MC+ 310 RONGESTK K.L.R.S.R.H.W. NGELAP 180 113011 310 AILINGINAE - --- ARNAH N. CAN 11011 RONGELAP Eva 10 317-0 KONBKALARN A-111C1 [1 2.33 WOTHO 2 NAN BIXINI ARE CHARLO 12.4 ŝ F

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Dr. White

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Sample Designator: S - SOLL W - MATIR F - FROIS U - UNIME

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5.121.0 NO.	DATE	TIES	LOCATION	DESCRITITION	<u>2022</u> 1
31	6 March	0800	Likiep Island, Likiep Atoll	Upper layer bars soil in random spots unshelter-	Naj H. Croa
NI.	e		A D	Collected from largest clatern on heaviest populated island of atoll	•
5 2	6 Harch	1200	Jemo Island	Sama as 91	•
W2		×	, N M	Same as WI	
S3	6 March	1700	Ailuk Island, Ailuk Atoll	Same as Sl	
₩3	#		1 10 11	Same as WI.	•
54	7 March	1300	Mejit Island	Same as Sl	•
¥4		×	# *	Sama as WI.	si .
W5-8	4 March	0900	Utirik Atoll	Composits of 4 vater samples taken by the USS RENAMAN	•
S-5	5 March	1600M	Ormed Island, Wotje Atoll	Composite of 5 samples (1 beach, 3 mid-village, 1 back village)	Dr. T. White
v 11	5 March		10 1 1 -	Composite: 1 from well, 2 from catch-basin	•
Sú	5 Narch	1730	Erikub Islani, Erikub Atoll	Composite of 2 samples (1 mid-village, 1 half- vay to beach)	W
S7	6 March	1130	Kaven Island, Meloelap Atoll	Composite of 4 samples (2 from village, 2 from paths to boach)	n
122	٠	n	H H	l from wall	#
*13	۲	R 🛔	u it	l from catch-basin	я Е
SS	6 Parch	1630	Wotho Island,	Composite of 3 samples (1 by well, 2 mid-village) u ĉ

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itker Islani	Utirik Island	Kebalia Islani	Enivotak Island	Erttrippu Island	B	*	2	Nongelap Island	Enivetak Island		Utdrik	8 3	я Э		Ξ.	Rongelap Island	Uttrik		Dalep Island , Bajuro Atoll	Wotho Island, Wotho Atoll	LOCATION
		,-			Near south clatern of village	1 mile morth of Pongolup village	Center portion of island	Soil from north purt of island	Distillation water Monjorik Atoll	Clatorn	Clatarn	South clatern in village	Clatern water from northern most village	Clatern whier from north part of island	Central cistern of village	Composite of 6 bottles Chart encluded to show location of bottles on fongelsp Island	Composite of 3 sumples	Tap water	Composits of 4 samples (near Admin Eldg)	1 from wall (catch-basin dry for 1 month plus)	DESCRIPTION
ש		=	z	з	7	•	-	3		-				Ŧ	Ŧ	Dr. P. Scoville	-	- 		Dr. T. MILLO	AGUIT (J)

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