DOCUMENTS SUBMITTED TO THE COURT AFTER THE FILING OF THE MEMORIAL

NOTE DU MINISTÈRE DES AFFAIRES ÉTRANGÈRES DE FRANCE À L'AMBASSADE DE NOUVELLE-ZÉLANDE À PARIS, EN DATE DU 5 OCTOBRE 1973[1]

Le ministère des affaires étrangères présente ses compliments à l'ambassade de Nouvelle-Zélande et se référant à sa note n° 1973/40 du 1er octobre 1973 a l'honneur de porter à sa connaissance ce qui suit.

Le ministère n'a rien à ajouter au document, relatant les dispositions prises à l'égard du *Green Peace III*, qui a été remis par courtoisie au Gouvernement néo-zélandais par l'ambassade de France à Wellington le 24 septembre.

En ce qui concerne les ressortissantes néo-zélandaises qui se trouvaient à bord du *Green Peace*, le ministère soumet à l'attention de l'ambassade les observations suivantes.

Ces personnes ont pénétré dans la zone de sécurité non point dans l'exercice d'activités normales (pêche, navigation maritime sur des routes habituelles) à laquelle l'institution de cette zone eût fait temporairement obstacle, mais aux fins d'interférer avec le programme d'expérimentation français et si possible d'en empêcher le déroulement.

Or la création de zones de sécurité dans le but de permettre des exercices militaires constitue un usage licite de la haute mer, pour autant que ces zones soient, comme la zone française, raisonnablement limitées dans l'espace et dans le temps.

Ces ressortissantes néo-zélandaises ont donc délibérément cherché, dans un désir de provocation dont elles ne pouvaient ignorer les conséquences, à faire obstacle à l'exercice par la France du droit en question.

En les conduisant sur le territoire français, le Gouvernement considère qu'il a pris une mesure raisonnable lui permettant de sauvegarder à la fois ses légitimes compétences étatiques et la sécurité de personnes dont les autorités néo-zélandaises pouvaient à bon droit se préoccuper.

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[1] Voir ci-dessus p. 404.

NOTE DE L'AMBASSADE DE FRANCE À WELLINGTON AU MINISTÈRE DES AFFAIRES ÉTRANGÈRES DE NOUVELLE-ZÉLANDE, EN DATE DU 10 JUIN 1974[1]

N° 31

L'ambassade de France présente ses compliments au ministère des affaires étrangères et a l'honneur de lui faire savoir que la présidence de la République française a annoncé le 8 juin 1974 que les mesures de sécurité de la zone d'expérimentations nucléaires du Pacifique Sud seraient remises en vigueur à partir du 11 juin.

Les essais atmosphériques auxquels il sera procédé cette année seront menés comme précédemment dans des conditions de complète sécurité. Leur innocuité a été confirmée par les rapports du Comité scientifique des Nations Unies dont les conclusions sont régulièrement publiées. Il est à noter que la France n'a cessé, à cet égard, de s'imposer des exigences extrêmes de sécurité et que les les résultats des années précédentes n'ont été contestés par quiconque au Comité scientifique des Nations Unies.

D'autre part, il convient de faire observer que la Présidence de la République française a décidé, contrairement aux années précédentes, de faire précéder l'ouverture de la campagne d'expérimentations nucléaires par un communiqué à la presse. Cette procédure a été choisie en raison du fait qu'un élément nouveau est intervenu dans le développement du programme de mise au point de la force de dissuasion française. Cet élément nouveau est le suivant: la France, au point où en est parvenue l'exécution de son programme de défense en moyens nucléaires, sera en mesure de passer au stade des tirs souterrains aussitôt que la série d'expériences prévues pour cet été sera achevée.

Ainsi, les essais atmosphériques qui seront prochainement effectués seront normalement les derniers de ce type.

Les autorités françaises expriment le vœu que le Gouvernement néo-zélandais *trouvera de l'intérêt à cette information et voudra la prendre en considération.*

[1] Voir ci-dessus p. 259 et ci-après p. 425.

LETTER OF 11 JUNE 1974 FROM THE NEW ZEALAND PRIME MINISTER TO THE PRESIDENT OF THE FRENCH REPUBLIC[1]

I have already had occasion to congratulate you on your election to office and wish you well in the tasks to which you have been called.

I regret that I must so soon after your election invite your attention to an outstanding issue between our two countries whose relationship is in every other respect excellent.

The decision announced from your office of a further series of atmospheric tests and the accompanying decision to conduct subsequent tests underground in French Polynesia has been conveyed to me by your Ambassador in Wellington.

France's nuclear tests programme in the South Pacific has, from the time it was forecast in 1963, been a matter of deep concern to the people of New Zealand and to successive New Zealand Governments which, over the years, have made repeated representations to France. Our involvement with France's nuclear tests programme was not of our choosing but was thrust upon us without consultation with us or with our neighbours. New Zealand Governments have also been called upon to represent the views of island territories with which this country has a constitutional relationship and independent island States towards whom New Zealand has special responsibilities.

In frankness I must tell you that the announcement to proceed to underground nuclear weapons testing, while it represents a measure of response to the concerns felt in New Zealand, does not accord with the long-term objectives we espouse. Any testing in any environment runs counter in our view to the need to bring under rational control at the international level a technology that could otherwise have the most devastating consequences for mankind. We in New Zealand feel that France is in a position to provide much-needed leadership in the area of nuclear arms control if she so chose.

Moreover, I have noted that the terms of the announcement do not represent an unqualified renunciation of atmospheric testing for the future. Adherence by France to the Partial Test Ban Treaty would provide a greater measure of assurance in this respect.

But our immediate concern arises from the fact that yet another round of atmospheric tests is to be held in French Polynesia. New Zealand opinion will not comprehend how a newly-constituted Government, enunciating new policies for France could proceed immediately with a series of such tests in spite of the concern that has been expressed over so many years by the peoples most immediately affected. The reports that a high yield explosion is contemplated are especially disturbing. The decision to carry on with the tests is the graver in that it will involve a further infringement, in disregard of France's traditional and valuable support for international law and international judicial procedures, of the interim measures order issued by the International Court of Justice in June 1973.

It is once more asserted in your Ambassador's recent Note that French testing is "harmless". Yet it is widely accepted both at the international and the national level that all unnecessary additions to background radiation, without compensating benefit, must be avoided on the ground that they may be hazardous for present and future generations. This principle is the cornerstone of the

[1] See p. 259, *supra*, and p. 425, *infra*.

Partial Test Ban Treaty. In respect of atmospheric tests conducted in the Pacific, New Zealand and the other countries and territories of the region have been given no choice. They have tacitly been invited to acquiesce in a concept of national interest which accords neither with our understanding of international law nor with our perception of the interests of the international community at large.

The dispute with France is not of New Zealand's seeking. Indeed, it has been our earnest endeavour, through the accepted means governing relations between States and with a proper regard for the understanding that must apply between friendly States, to resolve this area of contention.

I would hope that even at this stage you would be prepared to weigh the implications of any further atmospheric testing in the Pacific and resolve to put an end to this activity which has been the source of grave anxiety to the people in the Pacific region for more than a decade.

(Signed) Norman KIRK.

NOTE OF 17 JUNE 1974 FROM THE NEW ZEALAND EMBASSY IN PARIS TO THE FRENCH MINISTRY OF FOREIGN AFFAIRS[1]

The New Zealand Embassy presents its compliments to the Ministry of Foreign Affairs and has the honour to inform it that the New Zealand Government has good reason to believe that France conducted an atmospheric nuclear explosion at Mururoa on 16 June. Accordingly the Embassy is instructed by the New Zealand authorities to convey to the French authorities the New Zealand Government's strong protest at the resumption of atmospheric nuclear weapons testing at Mururoa.

The decision to proceed with these tests, in disregard of representations made over a period of many years, and renewed most recently in a letter of 11 June 1974 from the Prime Minister, Right Honourable Norman Kirk, to the President of France, His Excellency M. Valery Giscard d'Estaing, is viewed with the utmost concern by the Government and people of New Zealand. The Governments of the Cook Islands, Niue and the Tokelaus are at their request associated with this protest.

The announcement that France will proceed to underground tests in 1975, while presenting a new development, does not affect New Zealand's fundamental opposition to all nuclear testing, nor does it in any way reduce New Zealand's opposition to the atmospheric tests set down for this year: the more so since the French Government is unable to give firm assurances that no atmospheric testing will be undertaken after 1974.

The decision to proceed is the graver in that it involves a further infringement of the Interim Measures Order of the International Court of Justice of June 1973 in the case New Zealand versus France.

The French Government's attention is again drawn to the view of the New Zealand Government that such tests are a violation of international law. The New Zealand Government formally reserves the right to hold the French Government responsible for any damage or losses received by New Zealand or the Pacific Islands for which New Zealand has a responsibility as a result of any nuclear weapons tests conducted by France.

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[1] See p. 260, *supra*, and p. 425, *infra*.

REPORT OF NOVEMBER 1973 BY THE NEW ZEALAND NATIONAL RADIATION LABORATORY, ISSUED BY THE NEW ZEALAND DEPARTMENT OF HEALTH UNDER NO. NRL-F/51 AND ENTITLED "ENVIRONMENTAL RADIOACTIVITY FALL-OUT FROM NUCLEAR WEAPONS TESTS CONDUCTED BY FRANCE IN THE SOUTH PACIFIC DURING JULY AND AUGUST 1973, AND COMPARISONS WITH PREVIOUS TEST SERIES"[1]

Terms of Reference of Acknowledgement

In September 1957 the New Zealand Department of Health was charged, under a Cabinet directive, with the responsibility for monitoring environmental radioactive contamination in New Zealand and also in any Pacific areas with which New Zealand was associated.

The Department delegated this responsibility to its National Radiation Laboratory at Christchurch where the measurement of radioactive fallout became a natural extension of the work of the Laboratory in the fields of radiation protection—the control of radioactive pollution and the safe use of ionizing radiations in medicine, education, research, and industry.

The Laboratory operates two kinds of monitoring programme:

> Routine monitoring of long-lived fission products and natural radioactivity, largely for the New Zealand area, is carried out continuously and reported annually.
>
> During nuclear weapons tests in the South Pacific the programme is modified to include the measurement of short-lived fission products on an extended scale within New Zealand and throughout the Pacific Area. The results of each extended programme are now published in a separate report.

The Environmental Radioactivity Section of the Laboratory is responsible for the organisation of the monitoring operations, sample analyses, and reporting and interpretation of results:

L. P. Gregory, Officer in Charge, Monitoring Operations, Radiochemistry, Editorial Work
T. Baltakmens, Professional Officer, Radiochemistry
J. E. Dobbs, Senior Technical Officer, Gamma Spectroscopy
M. A. Findlay (Mrs.), Technician
G. K. Osborne, Technical Assistance and Draughting (Part Time)

The willing co-operation of Pacific Island Governments, Administrations, and their staffs during these programmes is appreciated.

The assistance of Government Departments in New Zealand, particularly the New Zealand Meteorological Service, and of those private companies which provide samples, is also gratefully acknowledged.

(Signed) H. J. YEABSLEY,
Director.

[1] See p. 255, *supra* and p. 425, *infra*.

Summary

Trace levels of fresh fission products from the first nuclear test of the 1973 series were detected in mid-August in some New Zealand air filters. At about the same time slight increases in the radioactivity of weekly rain collections were measured and iodine-131 was detected at low levels in several milk samples. Fallout from the subsequent nuclear tests of the series was not detected in New Zealand.

At Pacific Island stations marked increases in the radioactivity of air filters, rain samples, and increased levels of iodine-131 in milk occurred. These increases resulted mainly from westerly excursions of fission products particularly from the third and fifth explosions of the series. Fresh fission products arrived at Pacific Island stations in a matter of days after these nuclear tests. Measurements on migratory fish caught off Samoa show no contamination.

By the end of October levels had fallen to pre-test levels at all stations. The levels of fallout measured and reported herein are small fractions of the reference levels and do not constitute a public health hazard.

Introduction

From 22 July to 29 August 1973 France conducted her seventh series of atmospheric nuclear weapons tests in the South Pacific at Mururoa in the Tuamotu Archipelago. This report presents the results of the New Zealand extended monitoring programme which started on 12 July and finished on 31 October 1973. The results of measurements are also compared with those obtained during the previous French test series since 1966. A complete list of nuclear explosions in the atmosphere for each test series is given in Table 1 Appendix.

The reader is referred to Report NRL-F/49 for the results of the 1972 monitoring programme, and particularly to the earlier report NRL-F/47[1] for a discussion on radioactive fallout, and on the extended monitoring programmes conducted by the Laboratory including technical information on sample collection and measurement. The results to December 1972 of routine long-term measurements are given in the latest Annual Report[2].

The extent of the 1973 monitoring programme is shown in Figure 1. Measurements on migratory fish caught off Samoa were introduced this time. In all other respects the programme was the same as that conducted during 1972 namely: gamma radiation readings several times daily at the six Pacific stations to the east of Fiji which are nearest to the test zone, daily air filter collections for total beta activity assessment at four Pacific and four New Zealand stations, weekly rain collections for total beta activity assessment at nine Pacific and four New Zealand stations, and thrice weekly milk collections for measurement of iodine-131 at two Pacific and seven New Zealand stations.

Units

The unit of *Gamma Radiation Dose* used herein is the millirad (mRAD). For comparison purposes a dose rate of about 120 mRAD per year may be attributed to the "average" natural background radiation.

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[1] Fallout from nuclear weapons tests conducted by France in the South Pacific from June to August 1971 and comparisons with previous test series. NRL-F/47 March 1972. (Second printing October 1973.)

[2] Environmental Radioactivity Annual Report 1972. NRL-F/50 April 1973.

The unit of *Radioactivity* is the Curie (3.7×10^{10} disintegrations per second). Because this unit is too large for environmental levels of radioactivity smaller subdivisions are used: the millicurie (mCi)—one thousandth of a Curie; the picocurie (pCi)—one millionth of a millionth of a Curie (2.22 disintegrations per minute).

The results of measurements are presented as follows:

In air the concentration of mixed fission products is given in picocuries of total beta activity per cubic metre (pCi/m^2).

In rain the deposition of mixed fission products is given in millicuries of total beta activity per square kilometre (mCi/km^2).

The concentration of the fission products in rainwater is given in picocuries per litre (pCi/litre), and is calculated from the deposition and rainfall as follows:

$$\text{pCi/litre} = \frac{\text{mCi/km}^2 \times 100}{\text{centimetres of rain}}$$

In milk the concentration of iodine-131 is given in picocuries per litre (pCi/litre).

All times and dates are New Zealand Standard Time (G.M.T. + 12 hours).

Potential Health Hazard and Reference Levels

There are no internationally accepted "permissible levels" for the exposure of people to fallout from nuclear weapons testing. All of the measurements recorded in this report concern such contamination and it is considered necessary in the public interest to provide some guide by which the significance of the values may be appreciated.

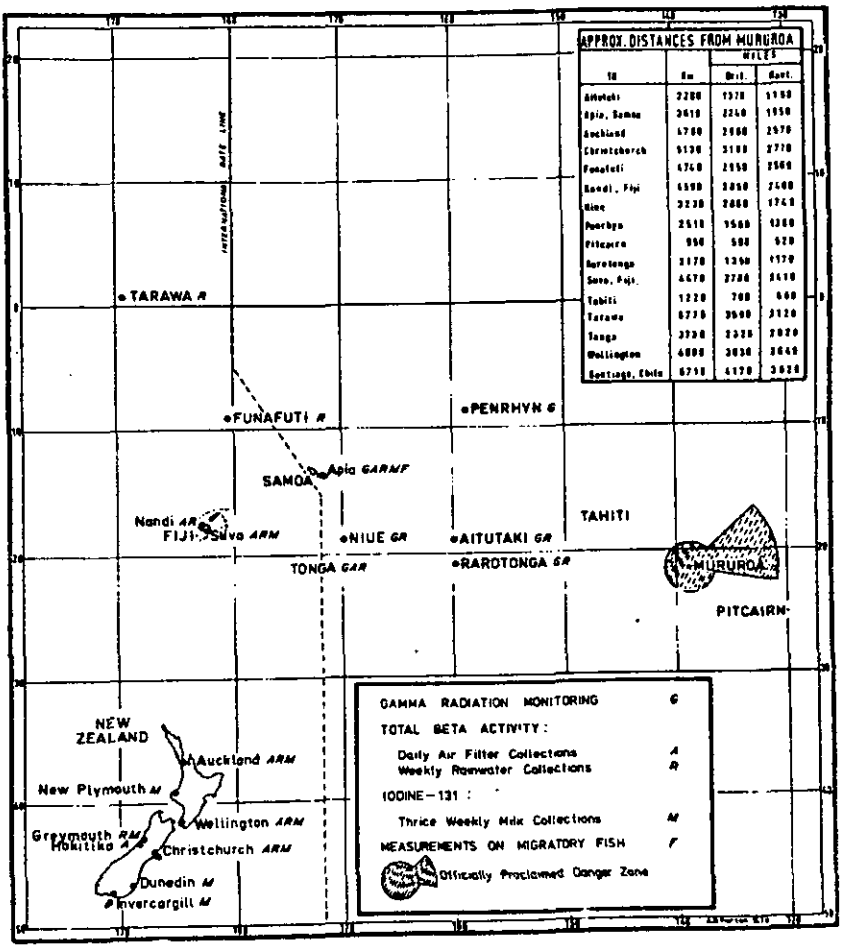
Development of Reference Levels

The simplest procedure is to compare measured values with those which would give the annual "Dose Limits" suggested by the International Commission on Radiological Protection (ICRP)[1]. These dose limits were established for individual members of the public so that the risks from controllable radiation sources should be no greater than other risks regularly accepted in everyday living. These dose limits are in fact one-tenth of the annual Maximum Permissible Doses for radiation workers. The Commission emphasizes that all controlled radiation exposures should be kept to the minimum practicable and that the risks should be justified in terms of benefits that would not otherwise be received.

The following "Reference Levels" have been derived from these dose limits, making allowance for the risk to children. In no case is a reference level greater than one-third of the concentration which, if maintained indefinitely, would lead to a dose limit. The media and radionuclides listed are those generally accepted as the key items for monitoring fallout contamination, and the units of concentration are those used in the reports of this Laboratory.

[1] Recommendations of the International Commission on Radiological Protection: ICRP Publication 9. Pergamon Press, 1966.

FIGURE 1. MONITORING AND COLLECTING STATIONS IN NEW ZEALAND AND ON PACIFIC ISLANDS



Reference Levels:

In Milk:	Strontium-90[1]	270 pCi/g Ca
	Caesium-137[1]	7,000 pCi/g K
	Iodine-131	200 pCi/litre
In Air:	Mixed fission products between 10 and 80 days old	300 pCi/m^3
In Rainwater:	Mixed fission products between 10 and 80 days old	6,000 pCi/litre

The ICRP "Dose Limits" specify annual exposures and therefore for those concentrations which can change rapidly with time, such as mixed fission products in air or in rain, or iodine-131 in milk, the average values over the year, rather than transient values, should be compared with the reference levels.

If, during any one year, the average levels do not greatly exceed the reference levels then any resulting increase in risk to the health of an individual would be insignificant, and would not, in itself, justify the disruptions and possible risks associated with remedial actions.

Comparison of Reference Levels with Natural Radiation Background

It is also necessary to consider the possible hazards from continuing weapons tests. Under these conditions long-lived radioactive debris, accumulating in the environment, and the regular presence of short-lived material, may cause exposure over many years. In this context it is helpful to compare the average (over many years) of the annual doses from fallout with that due to background radiation to which the human race has always been exposed.

The level of background radiation varies markedly from place to place. For reference purposes, however, the "average" annual dose received from the natural environment may be taken as about 120 millirads.

There are a number of areas with large populations where the annual background dose is several times this value. No survey has to date demonstrated that there is a health hazard associated with living in such a region. On the other hand it has not been possible to demonstrate that there is a threshold dose below which no effect on health is produced.

If the reference levels were maintained indefinitely, they would each lead to a dose rate of the same order as that received from average natural background radiation. Thus if a long term average level is expressed as a percentage of a reference level then the resulting risk will be about the same percentage of any risk which may be eventually attributed to radiation from the natural environment.

Results of the 1973 Monitoring Programme

1. Gamma Radiation Monitoring

This monitoring service is conducted several times daily at the six Pacific Island stations nearest the nuclear test zone. A reporting level of 0.3 mRAD per hour was originally set when French South Pacific nuclear testing commenced

[1] The levels of the long lived radionuclides strontium-90 and caesium-137 to December 1972 are given in Report No. NRL-F/50.

in 1966. This reporting level, however, has never been reached. For the 1973 series a lower "level of interest" of 0.05 mRAD per hour was set. This level was not reached during the monitoring programme.

2. Fission Products in Air

At the four New Zealand stations air is sampled continuously. The filters are changed three times each week and measured for total beta activity. Levels fell steadily during the first half of 1973. During January station averages were from 0.02 to 0.03 picocuries per cubic metre and thereafter they decreased to the minimum detectable level 0.01 pCi/m^3 or less during July. The extended monitoring programme covering the French Pacific tests commenced with daily air filter changes immediately after the first nuclear test of 22 July was reported. Levels remained very low until the period 9 to 16 August, 18 to 25 days later. Trace levels of fresh fission products were then detected on several occasions. A maximum concentration of 0.17 pCi/m^3 occurred at Auckland on 14 August. This delay of about three weeks in the arrival of fresh fission products over New Zealand is consistent with the fission products having been carried around the hemisphere in an easterly direction by prevailing winds. Although the levels were very low an attempt was made to determine the date of origin of the fission products by careful measurement of the rate of radioactive decay in selected samples. These measurements confirmed that the fission products originated in the first nuclear test of the 1973 Pacific series. (See Fig. 3 Appendix.) This evaluation was only possible with these samples because of the extremely low levels immediately prior to the period of interest. The average level during August ranged from 0.02 pCi/m^3 at Hokitika to 0.04 pCi/m^3 at Auckland. During September levels decreased, and during October they were again at the minimum detectable level. No increases arising from the later nuclear tests of the series were detected at the New Zealand stations.

At the four Pacific Island stations the situation was very different. Only one sample, at Tonga, exceeded 0.1 pCi/m^3 during the period when trace levels were measured in New Zealand. However, marked increases were measured at all the Pacific Island stations later in August and early in September after the final three nuclear tests of the series. These increases resulted from westerly excursions of fission products which arrived in the central Pacific area in a matter of days after the nuclear tests. The third and fifth low yield explosions caused the main increases but there are indications that the fourth, very low-yield explosion may also have contributed. Increased levels were first detected at Samoa on 23 August when four-day-old fission products from the test of 19 August were measured at a level of 10 pCi/m^3. The maximum levels measured occurred at Samoa in two separate peaks: 117 pCi/m^3 on 25 August (six-day-old fission products from the test of 19 August), and 43.5 pCi/m^3 on 5 September (seven-day-old fission products from the test of 29 August). The average levels at Samoa were 0.01 pCi/m^3 during July, 5.90 during August, and 3.42 during September. At the other Pacific Island stations (Nandi, Suva and Tonga) the levels were very much lower, although not as low as those at the New Zealand stations. During October levels dropped to very low values, near the minimum detectable level, at all stations.

In the Appendix the results of measurements are given in tabular and graphical form (Table 2, Fig. 2); the determination of the origin of the fission products collected and hence the age at collection is shown graphically (Fig. 3); and average levels during each monitoring programme since 1966 are compared (Fig. 4, Table 3). It should be noted that in Figure 2 the results of daily air

radioactivity are presented on a logarithmic scale in order to accommodate the range of activities measured. This graph is therefore not directly comparable with similar graphs published for earlier monitoring programmes.

The average levels of mixed fission products in air at all stations during the monitoring programme were very small fractions of the reference level.

3. Fission Products in Rain

At the four New Zealand stations the weekly deposition of fission products in rain has remained very low throughout the monitoring period. Slight increases, less than one millicurie of total beta activity per square kilometre, were observed at Auckland and Wellington during 10-17 August, and at Greymouth during 11-18 August, at about the same time that trace increases were detected in New Zealand air filters.

At the nine Pacific Island stations, however, marked increases were measured in weekly rain collections at most stations during August and September. These increases resulted mainly from the westerly excursion of fission products from the third and fifth nuclear tests of 19 and 29 August. The highest depositions, greater than 100 mCi/km^2 at mid-collection time, occurred at Rarotonga and Aitutaki—the two stations nearest Mururoa: at Rarotonga 206 mCi/km^2 during 30 August-6 September (four-day-old fission products); at Aitutaki 140 kmCi/km^2 during 16-23 August (four-day-old fission products from 19 August test—in this case the activity is calculated as at the last day of collection), also at Aitutaki 263 mCi/km^2 during 30 August-6 September (four-old-day fission products). Increases between 10 and 100 mCi/km^2 occurred at Tonga, Niue, Samoa, Suva and Funafuti. One sample collected at Niue during 28 August-3 September contained fission products apparently originating from the fourth very low power explosion of 25 August.

The minimum transport times for westerly excursions of fission products from Mururoa appears to be less than four days to the Cook Islands and about 8 days to Funafuti in the Gilbert and Ellice Islands.

In the Appendix the results of weekly deposition at each station are listed in Table 4, together with the total deposition and average concentration of fission products in rain during each monitoring programme since 1966. The maximum gamma radiation dose to infinity arising from fallout deposition during each monitoring period is also listed for each station. The average daily deposition at each station during the 1973 programme is shown graphically on a logarithmic scale in Figure 5, and the determination of the origin of fission products and age at collection is shown in Figure 6.

At all stations the average concentrations of fission products in rain were small fractions of the reference level, and the gamma radiation dose from fallout deposition was a very small fraction of that arising from the natural radiation environment.

4. Iodine-131 in Milk

Iodine-131 was first detected in New Zealand milk at the limit of detection (2 picocuries per litre) at New Plymouth on 15 August. Maximum values of 7 pCi/litre occurred at Auckland and New Plymouth on 17 August and occasional values reaching 3 or 4 pCi/litre were measured at some stations during the following week. This period was about one week after trace levels of fission products were detected in the New Zealand air filters. Thereafter levels remained near or below the limit of detection. After 12 September levels remained below the limit

of detection at all New Zealand stations and this monitoring service was terminated in mid-October. The country-wide average level for the monitoring period was less than the detection limit.

At Suva and Apia, iodine-131 was present in most samples collected from late August to the end of September. Maximum values were 15 pCi/litre at Suva on 14 September, and 88 pCi/litre at Apia on 7 September. The average levels for each station, however, were very small fractions of the reference level.

In the Appendix individual results are listed in Table 5, and are shown graphically in Figure 7 where they may be compared with results from the previous monitoring programmes. Longer term average levels and the comparison of these with the reference level are given in Table 6 for each monitoring programme since 1966.

5. Monitoring of Migratory Fish

Migratory fish caught off Samoa during the monitoring period have been measured for fallout contamination.

This new programme started with measurements on tuna caught in New Zealand coastal waters during late 1972 and early 1973 to provide "background" levels for comparison. Nineteen samples consisting of the flesh of Albacore, Skipjack Tuna, and Kahawai were measured by gamma spectroscopy. The radioactivity measured was almost entirely due to naturally occurring potassium-40, ranging from 3.0 to 4.3 picocuries per gram (wet weight). Particular attention was paid to the measurement of long-lived caesium-137 which would be expected to be present in the soft tissue. The limit of detection for caesium-137 in these measurements was 0.03 pCi/g which is somewhat less than the concentration commonly found in land food samples (meat and milk) over the last several years in New Zealand. The concentration of caesium-137 was below the limit of detection in most of the fish samples. The range of activities measured was from less than 0.03 to 0.06 ± 0.03 pCi/g (wet weight). No other radionuclides were detected in these samples.

During the monitoring programme 38 samples of migratory fish had been measured at the time of closing this report, and the measurements will be continued for another month or so. The samples comprise Rainbow Runner, Skipjack and Yellowfin Tuna caught two to five miles off Apia harbour Samoa during the period 3 August to 3 October. The concentration of naturally occurring potassium-40 ranged from 1.2 to 5.2 pCi/g (wet weight), and caesium-137 ranged from less than 0.03 to 0.10 ± 0.04 pCi/g (wet weight). Other radionuclides which were particularly looked for and were not detected were barium-140, iodine-131, and zinc-65.

Artificial radioactivity measured in fish during the monitoring period was not significantly different to that measured in the pre-test New Zealand samples. The radioactivity was almost entirely due to naturally occurring potassium-40 which exhibited a greater range in the samples caught off Samoa.

APPENDIX

TABLE 1. FRENCH NUCLEAR TESTS IN THE SOUTH PACIFIC 1966-1973

The power of the nuclear explosion is classified as follows:

very low	less than 1 kiloton
low	1 to 20 kiloton
low-intermediate	20 to 200 kiloton
intermediate	200 to 1000 kiloton
high	1000 kiloton (1 megaton) or more

Year	*New Zealand Date*	*Power* [1]	*Duration of Monitoring Period*
1966	3 July	low-intermediate	
	20 July	low-intermediate	1 July
	12 September	low-intermediate	to
	25 September	low-intermediate	31 December
	5 October	intermediate	
1967	6 June	low	1 June
	28 June	low-intermediate	to
	3 July	low-intermediate	30 September
1968	8 July	low-intermediate	
	16 July	intermediate	4 July
	4 August	low-intermediate	to
	25 August	high	30 November
	9 September	high	
1969	No Nuclear Tests in the Pacific		
1970	16 May	low	
	23 May	intermediate	
	31 May	high	
	25 June	low	16 May
	4 July	high	to
	28 July	very low	31 October
	3 August	low-intermediate	
	7 August	intermediate	
1971	6 June	low-intermediate	
	13 June	intermediate	4 June
	5 July	low	to
	9 August	low	31 October
	15 August	high	
1972	26 June	very low	20 June
	1 July	low	to
	28 July	low	30 September
1973	22 July	low	
	29 July	very low	12 July
	19 August	low	to
	25 August	very low	31 October
	29 August	low	

[1] In the graphical presentation of results in this report, very low to intermediate devices in the kiloton range are represented by an arrow ↓. Hydrogen bombs in the megaton range are represented by a larger arrow ⇓.

TABLE 2. TOTAL BETA ACTIVITY OF AIR FILTER SAMPLES 1973

In Picocuries per Cubic Metre

Collection: From 9.00 a.m. on the date shown to 9.00 a.m. on the following date.
Measurement: Routinely 4 days after collection. The result is adjusted to the activity at collection when there is a significant difference. The apparent age of the fission products at collection is then given in days in parenthesis.

Date	*Pacific Islands*				*New Zealand*			
	Nandi Fiji	*Suva Fiji*	*Apia Samoa*	*Tonga*	*Auck-land*	*Wel-lington*	*Hoki-tika*	*Christ-church*
July 12	0.02	<0.01	0.02	0.02				
13	0.02	0.02	<0.01	0.02				
14	0.02	0.02	<0.01	0.03				
15	0.02	0.03	0.02	0.01				
16	0.01	0.04	0.02	0.01				
17	0.02	N.S.	0.02	<0.01				
18	0.02	0.01	0.02	<0.01				
19	0.02	<0.01	<0.01	0.02				
20	0.02	<0.01	<0.01	<0.01		<0.01		
21	0.02	0.02	0.01	0.02		0.01		
22	0.01	0.02	0.02	0.02		<0.01		
23	0.03	0.03	<0.01	0.02	<0.01	<0.01	0.01	0.02
24	0.02	0.02	0.02	0.03	0.01	<0.01	<0.01	<0.01
25	0.03	0.03	0.01	0.02	0.01	<0.01	<0.01	<0.01
26	0.04	0.02	<0.01	0.02	0.02	<0.01	0.01	<0.01
27	<0.01	<0.01	0.03	0.01	<0.01	<0.01	0.02	0.01
28	0.03	<0.01	0.02	0.02	0.02	<0.01	<0.01	<0.01
29	0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	0.02
30	<0.01	0.01	0.02	0.01	0.01	<0.01	0.01	0.02
31	N.S.	0.02	<0.01	0.02	0.01	<0.01	<0.01	0.02
July Av.	0.02	0.02	0.01	0.02	0.01	<0.01	<0.01	0.01
Aug. 1	0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.01	0.01
2	<0.01	<0.01	<0.01	0.01	0.03	<0.01	<0.01	0.02
3	0.01	0.01	0.02	<0.01	0.01	<0.01	<0.01	0.01
4	<0.01	<0.01	0.01	<0.01	0.04	<0.01	<0.01	<0.01
5	0.02	0.02	0.01	<0.01	<0.01	0.01	<0.01	<0.01
6	0.03	0.02	0.01	0.01	0.01	<0.01	0.03	<0.01
7	0.03	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
8	0.03	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
9	0.04	0.06	0.02	0.04	0.11[1]	0.02	<0.01	0.01
10	0.04	0.05	0.03	0.02	0.02	<0.01	0.04	0.04
11	0.04	0.03	<0.01	0.02	0.07	0.11[1]	0.01	0.02
12	0.03	0.03	0.02	0.07	0.04	0.06	0.01	0.12[1]
13	0.03	0.03	0.03	0.11	0.09	0.10[1]	0.05	0.10[1]
14	0.02	0.07	0.03	0.06	0.17[1]	0.08	0.02	0.03
15	0.03	0.04	0.01	0.03	0.12	0.02	0.02	0.03
16	0.03	0.03	0.02	0.03	0.12	0.03	0.05	0.04

N.S. No Sample.

[1] The origin of the fission products in these low level New Zealand filters has been determined to be the first test of the series (see Fig. 3, p. 315).

TABLE 2. TOTAL BETA ACTIVITY OF AIR FILTER SAMPLES 1977 *(cont.)*

Date	*Pacific Islands*				*New Zealand*			
	Nandi Fiji	*Suva Fiji*	*Apia Samoa*	*Tonga*	*Auck-land*	*Wel-lington*	*Hoki-tika*	*Christ-church*
17	0.01	0.02	0.02	0.02	0.01	0.06	0.04	0.06
18	0.05	0.03	0.03	0.02	< 0.01	0.01	0.06	0.02
19	0.03	0.02	0.02	0.02	0.02	0.04	0.07	0.08
20	0.01	0.03	0.01	0.04	0.04	0.02	< 0.01	0.08
21	0.03	0.03	0.05	0.02	0.03	0.03	0.02	0.02
22	0.04	0.01	0.05	0.03	0.02	0.03	0.03	0.01
23	0.05	0.06	10.0 (4)	0.03	0.01	N.S.	0.03	0.04
24	0.02	0.03	7.5 (5)	0.02	0.02	0.03	0.05	0.04
25		0.08	117 (6)	0.03	0.02	0.05	0.06	0.04
26	0.33[1](7)	1.93(7)	47.4 (7)	5.43(7)	< 0.01	0.02	0.03	0.04
27	0.44(8)	0.11	0.09	1.03(8)	0.03	< 0.01	< 0.01	0.06
28	0.06	N.S.	0.51 (6)	0.03	0.03	< 0.01	0.02	0.02
29	0.05	0.06	0.32(10)	0.04	0.04	0.04	0.03	0.02
30	0.04	0.05	0.06	0.05	0.02	0.02	0.01	0.01
31	0.06	0.05	0.06	0.08	0.03	0.02	0.02	0.01
Aug. Av.	0.06	0.10	5.90	0.24	0.04	0.03	0.02	0.03
Sep. 1	0.05	0.06	0.03	0.04	0.01	0.02	< 0.01	0.01
2	0.03	0.03	0.03	0.04	< 0.01	< 0.01	0.02	0.02
3	0.05	0.09	0.05	0.04	0.03	0.02	0.03	0.02
4	0.05	0.08	28.6 (6)	0.02	0.02	0.03	N.S.	0.01
5	0.05	0.05	43.5 (7)	0.04	0.04	0.02	0.02	0.01
6	N.S.	0.04	1.21 (8)	0.03	0.02	0.02	0.02	0.01
7	0.06	0.03	21.5 (9)	0.07	< 0.01	< 0.01	0.02	0.01
8	0.22(10)	0.04	1.64(10)	0.02	< 0.01	0.03	0.02	0.01
9	0.04	0.05	0.18	0.03	0.05	0.02	0.04	0.04
10	0.06	0.05	1.72(12)	0.03	0.02	0.04	0.04	0.02
11	0.04	0.07	1.79(13)	0.04	0.02	0.02	0.03	0.02
12	0.19(14)	0.16(21)	1.45(14)	0.04	< 0.01	< 0.01	0.02	0.01
13	0.04	0.04	0.12	0.03	0.03	0.02	0.02	0.02
14	0.05	0.02	0.08	0.01	0.02	0.03	0.02	0.02
15	0.06	0.04	0.08	0.02	< 0.01	0.02	0.04	0.02
16	0.04	0.03	0.05	0.02	0.03	0.02	0.02	0.02
17	0.03	0.09	0.04	0.03	0.03	0.02	0.03	0.04
18	0.04	0.02	0.08	0.27(28)	< 0.01	0.02	0.02	0.01
19	0.07	0.05	0.07	0.79(20)	0.03	< 0.01	0.01	0.02
20	0.09	0.54(23)	0.26(23)	0.09	0.03	0.02	0.03	0.01
21	0.10	0.09	0.02	0.05	0.02	0.03	0.02	< 0.01
22	0.05	0.03	0.02	0.05	0.03	< 0.01	0.01	0.02
23	0.03	0.03	0.02	0.04	< 0.01	< 0.01	0.01	0.02
24	0.04	0.03	0.03	0.05	0.03	0.01	0.01	0.05
25	0.02	0.04	0.04	0.04	0.04	0.03	0.02	0.01
26	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.02
27	0.03	0.03	0.02	0.02	0.02	0.04	0.01	0.02
28	0.05	0.02	0.01	0.01	0.01	< 0.01	0.01	0.02
29	0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
30	0.01	0.03	0.01	< 0.01	0.01	0.01	0.02	0.02
Sep. Av.	0.06	0.06	3.42	0.07	0.02	0.02	0.02	0.02

[1] 2-day collection. N.S. No Sample.

TABLE 2. TOTAL BETA ACTIVITY OF AIR FILTER SAMPLES 1977 *(concl.)*

Date		*Pacific Islands*				*New Zealand*			
		Nandi Fiji	*Suva Fiji*	*Apia Samoa*	*Tonga*	*Auck-land*	*Wel-lington*	*Hoki-tika*	*Christ-church*
Oct.	1	0.03	0.02	0.03	0.02	0.01	0.01	< 0.01	< 0.01
	2	N.S.	0.05	0.01	0.01	0.02	0.03	0.01	< 0.01
	3	N.S.	0.02	< 0.01	0.01	0.01	< 0.01	< 0.01	0.01
	4	N.S.	< 0.01	0.02	0.03	< 0.01	0.01	0.02	0.01
	5	0.02	0.01	< 0.01	0.02	< 0.01	< 0.01	N.S.	0.03
	6	0.01	N.S.	0.02	0.02	0.02	N.S.	< 0.01	0.01
	7	0.03	0.02	0.02	0.02	0.02	0.01	< 0.01	0.01
	8	0.01	< 0.01	0.03	0.02	0.02	0.01	< 0.01	0.01
	9	0.02	0.01	< 0.01	0.01	0.03	< 0.01	0.02	< 0.01
	10	0.02	0.02	< 0.01	0.03	< 0.01	0.02	0.01	0.02
	11	0.02	0.02	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.02
	12	0.03	N.S.	0.02	0.02	< 0.01	< 0.01	< 0.01	0.01
	13	0.03	0.03	0.02	0.02	0.02	< 0.01	0.01	0.03
	14	0.03	0.02	0.03	0.02	< 0.01	< 0.01	< 0.01	< 0.01
	15	0.06	0.02	0.01	0.02	0.02	< 0.01	< 0.01	0.02
	16	0.03	0.03	< 0.01	0.02	0.01	< 0.01	< 0.01	< 0.01
	17	< 0.01	0.03	0.01	0.04	< 0.01	< 0.01	0.01	< 0.01
	18	0.02	0.02	0.02	0.03	< 0.01	< 0.01	< 0.01	0.02
	19	0.01	0.02	0.02	0.02	0.01	0.02	< 0.01	0.01
	20	0.04	0.02	< 0.01	0.02	< 0.01	0.01	0.02	0.01
	21	0.02	0.03	0.02	0.01	0.02	< 0.01	< 0.01	0.01
	22	0.02	0.02	0.02	0.02	< 0.01	0.02	0.01	0.01
	23	< 0.01	N.S.	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
	24	N.S.	< 0.01	0.01	0.01	0.01	0.01	< 0.01	0.02
	25	0.02	< 0.01	0.02	0.01	0.01	< 0.01	< 0.01	0.01
	26	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01	0.02	0.01
	27	< 0.01	N.S.	< 0.01	0.02	< 0.01	0.02	0.02	0.01
	28	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01
	29	0.01	0.01	0.01	< 0.01	0.02	0.02	0.02	0.02
	30	0.02	0.02	0.02	0.03	< 0.01	0.01	< 0.01	0.02
	31	0.02	0.01	< 0.01	0.01	< 0.01	< 0.01	0.02	0.01
Oct. Av.		0.02	0.02	0.01	0.02	0.01	< 0.01	< 0.01	0.01

N.S. No Sample.

FIGURE 2. DAILY AIR RADIOACTIVITY 1973

(Graphical presentation of Table 2)

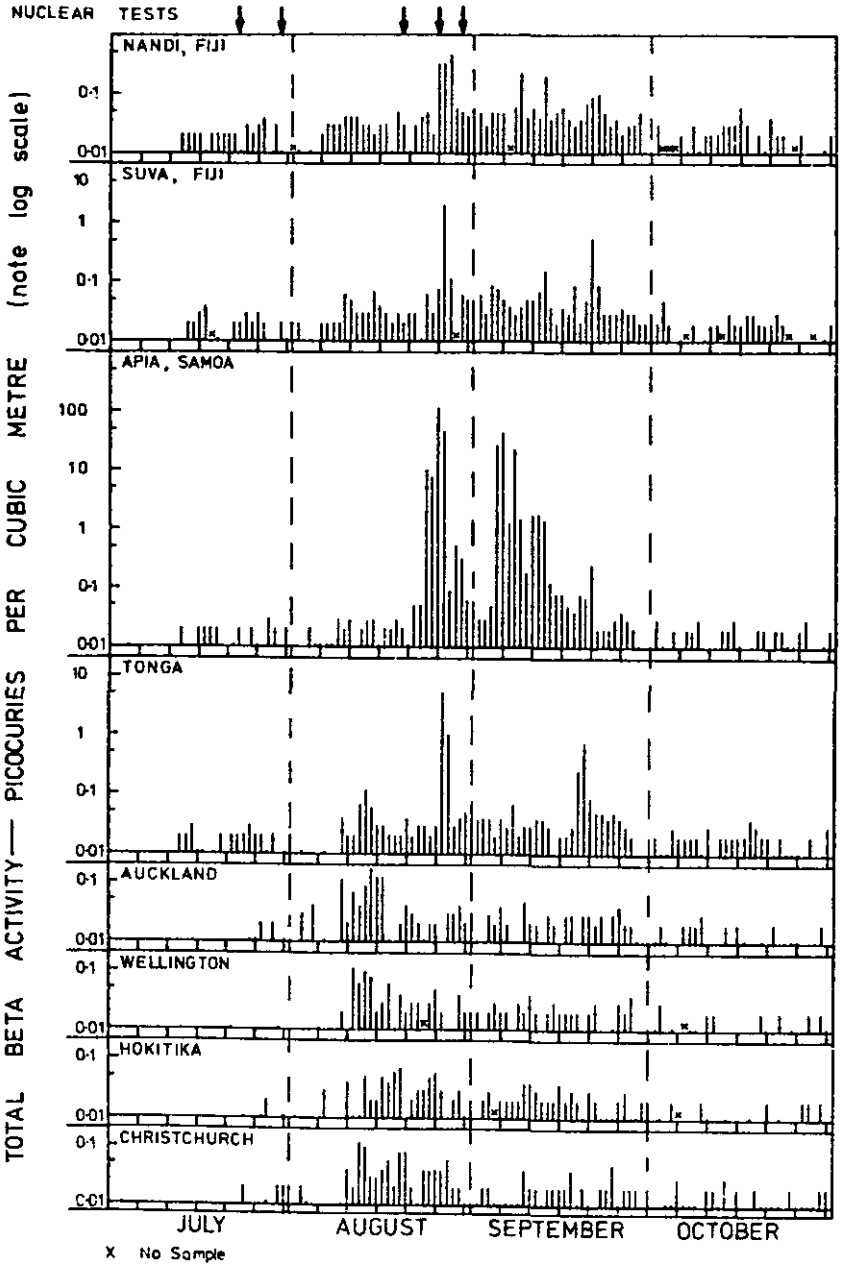


FIGURE 3. THE ORIGIN OF FRESH FISSION PRODUCTS IN AIR FILTER SAMPLES 1973

(as determined by measurement of the rate of radioactive decay)

The vertical scale gives values of $A^{-0.833}$ where A is the relative activity of the samples at successive measurement times. The estimated time of origin is given by the point where the extrapolated line of best fit cuts the date axis.

The collection period is shown thus: ⌇, and bomb tests thus: ☁.

On this page the two-sigma bars (95% confidence level) are shown for the six low level New Zealand samples.

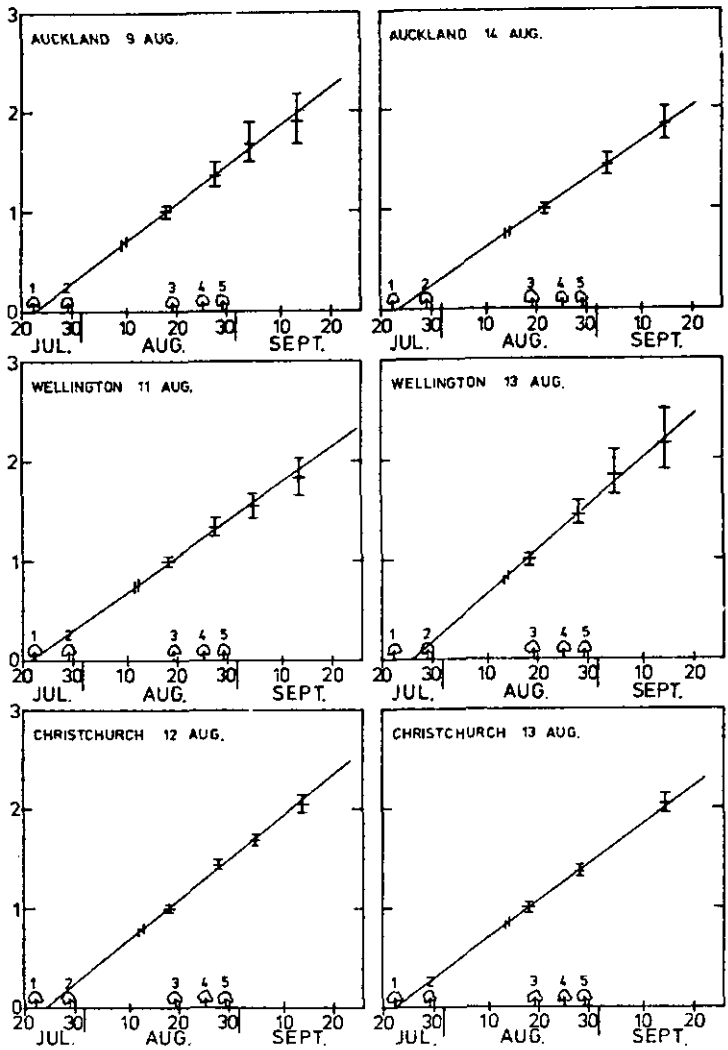


FIGURE 3. THE ORIGIN OF FRESH FISSION PRODUCTS IN AIR FILTER SAMPLES 1973 *(cont.)*

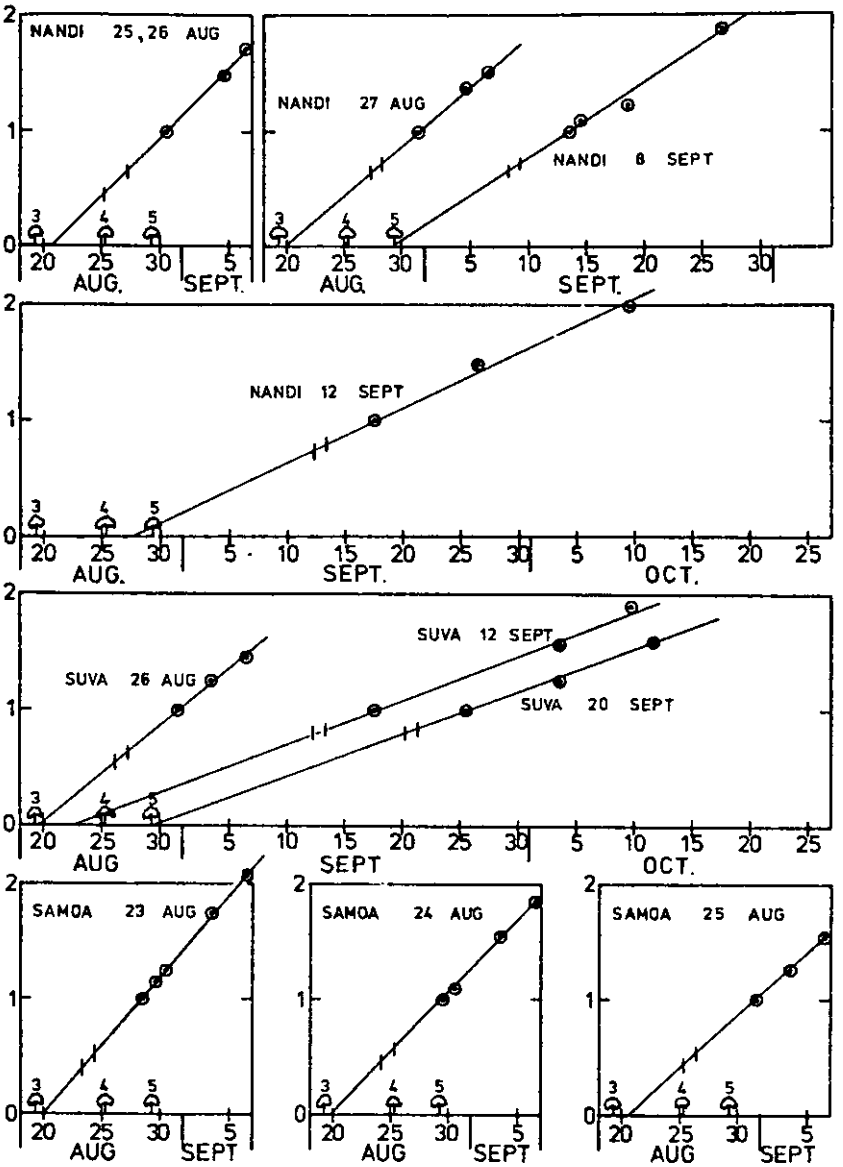


FIGURE 3. THE ORIGIN OF FRESH FISSION PRODUCTS IN AIR FILTER SAMPLES 1973 *(cont.)*

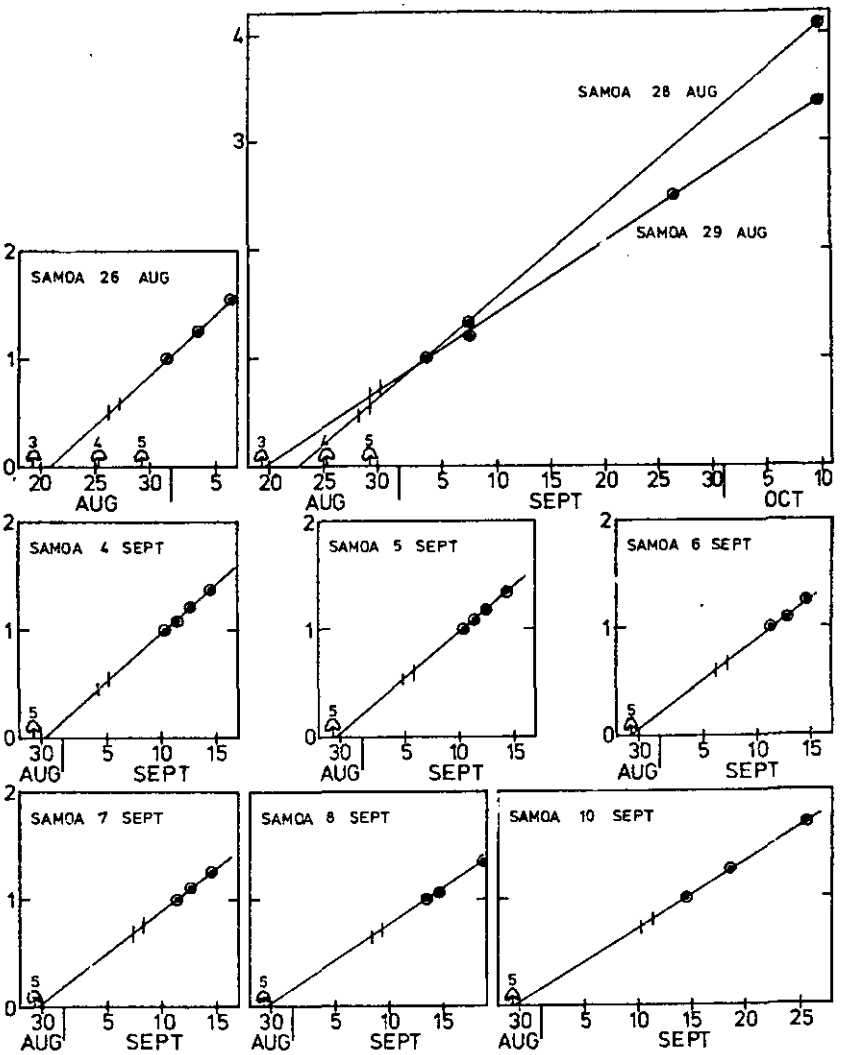


FIGURE 3. THE ORIGIN OF FRESH FISSION PRODUCTS IN AIR FILTER SAMPLES 1973 *(concl.)*

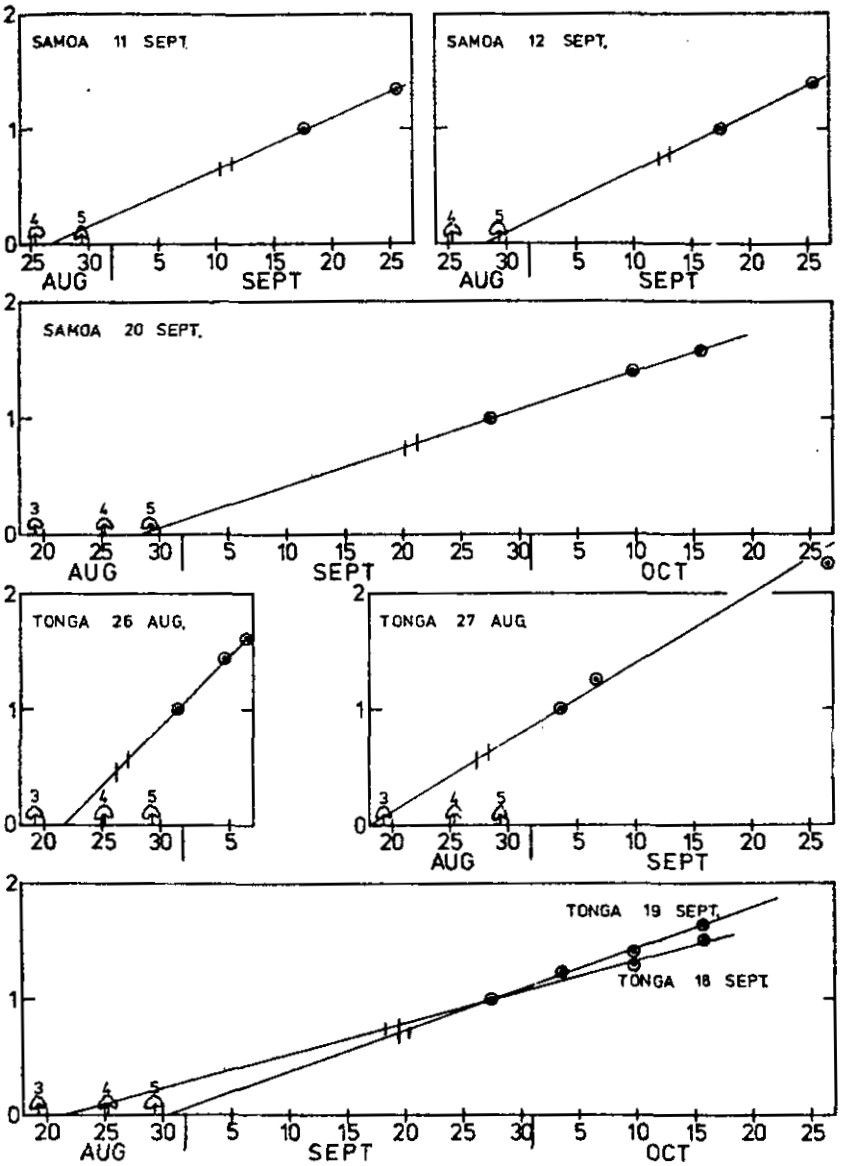


FIGURE 4. AVERAGE MONTHLY AIR RADIOACTIVITY DURING EACH MONITORING PROGRAMME SINCE 1966

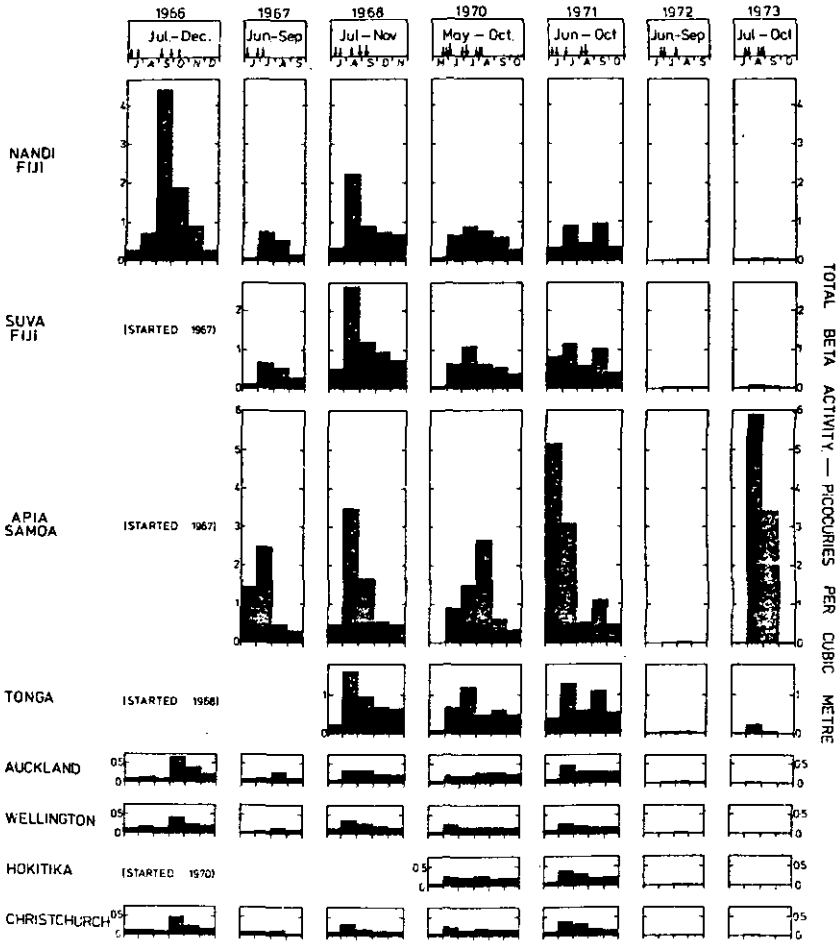


TABLE 3. AVERAGE AIR RADIOACTIVITY DURING EACH MONITORING PERIOD [1]

Station	*(Total Beta Acitivity—pCi/m³)*						
	1966	*1967*	*1968*	*1970*	*1971*	*1972*	*1973*
Nandi, Fiji	1.39	0.38	0.97	0.56	0.58	0.04	0.04
Suva, Fiji	—	0.37	1.22	0.62	0.81	0.05	0.05
Apia, Samoa	—	1.15	1.30	1.06	2.05	0.04	2.55
Tonga	—	—	0.81	0.60	0.75	0.05	0.09
Auckland	0.26	0.11	0.22	0.22	0.27	0.05	0.02
Wellington	0.17	0.07	0.19	0.16	0.15	0.03	0.02
Hokitika	—	—	—	0.18	0.20	0.03	0.01
Christchurch	0.18	0.08	0.14	0.14	0.19	0.03	0.02

[1] The duration of each monitoring period is given in Table 1.

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973

Collection: From date shown to start of next collection.

Measurement: In most cases from four days to two weeks after collection depending on available sample transport facilities. The activity at the time of measurement is adjusted to that at mid-collection time when increased levels of fresh fission products are measured. The apparent age of the fission products in days is then given in parentheses after the deposition value.

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km^2)*	*Year*	*Total Deposition (mCi/km^2)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Tarawa:						
July 12	Nil	0.2				
19	Nil	0.3				
26	Nil	< 0.1				
Aug. 3	0.1	0.2				
10	0.9	0.1				
17	< 0.1	0.2	1966	82.8	95	3.1
24	< 0.1	0.2	1967	185.1	523	7.0
31	Trace	0.5	1968	43.2	113	1.6
Sep. 7	0.1	9.0 (13)	1970	41.2	142	1.6
14	Nil	0.4	1971	24.8	65	0.9
21	Trace	0.3	1972	6.2	5	0.2
28	< 0.1	0.3	1973	12.8	441	0.3
Oct. 4	1.4	0.6				
12	0.1	0.2				
19	0.2	0.3				
Total	2.9	12.8				
Funafuti:						
July 12	0.3	0.2				
16	2.2	< 0.1				
23	4.7	< 0.1				
30	1.5	< 0.1				
Aug. 6	Nil	0.3				
13	6.8	0.5				
20	3.8	0.4	1966	257.7	112	9.8
23	1.1	0.2	1967	504.6	530	19.2
27	3.5	0.4	1968	220.6	211	8.4
Sep. 3	2.0	66.2 (8)	1970	147.6	95	5.6
10	1.0	0.9	1971	78.7	88	3.0
18	2.8	< 0.1	1972	3.8	6	0.1
24	< 0.1	0.2	1973	70.4	116	0.8
Oct. 1	0.6	0.2				
6	8.7	0.1				
14	13.6	0.4				
22	8.3	0.2				
Total	60.9	70.4				

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973 *(cont.)*

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km²)*	*Year*	*Total Deposition (mCi/km²)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Nandi, Fiji:						
July 12	1.7	0.3				
16	7.5	0.1				
24	Trace	0.1				
31	0.8	0.1				
Aug. 7	8.6	0.2				
13	0.4	0.1	1966	32.4	73	1.2
28	1.7	0.8	1967	8.1	54	0.3
Sep. 17	14.4	0.8	1968	81.4	277	3.1
28	7.7	0.2	1970	31.9	96	1.2
Oct. 10	0.3	0.1	1971	27.0	63	1.0
			1972	3.3	45	0.1
			1973	2.8	6	0.1
Total	43.1	2.8				
Suva, Fiji:						
July 12	0.9	0.3				
19	7.2	0.3				
24	0.5	0.1				
31	8.7	0.5	1966	179.0	297	6.8
Aug. 7	< 0.1	0.3	1967	49.9	103	1.9
14	0.3	0.2	1968	137.0	277	5.2
21	3.7	10.3 (5)	1970	144.2	139	5.5
28	0.6	0.4	1971	141.3	139	5.4
Sep. 3	1.2	2.9 (19)	1972	5.7	14	0.2
10	0.7	0.9	1973	18.4	41	0.3
17	1.7	0.7				
24	9.1	0.4				
Oct. 1	1.4	0.3				
8	1.8	0.3				
16	7.0	0.5				
Total	44.8	18.4				

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973 *(cont.)*

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km²)*	*Year*	*Total Deposition (mCi/km²)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Apia, Samoa:						
July 12	0.9	0.3				
19	0.2	0.2				
26	4.9	0.2				
Aug. 2	8.1	0.4				
9	0.3	0.4				
16	6.3	0.4	1966	[1]	[1]	52.0
23	7.9	97.4 (6)	1967	88.3	111	3.4
28	0.7	0.7	1968	144.7	128	5.5
30	1.9	1.1	1970	121.7	163	4.6
Sep. 3	1.3	28.6 (6)	1971	111.4	236	4.2
6	1.3	13.1 (12)	1972	6.5	9	0.2
14	2.9	0.9	1973	146.8	154	1.4
20	7.3	0.6				
28	16.1	0.5				
Oct. 4	6.4	0.2				
10	13.1	0.6				
18	7.6	0.7				
24	8.4	0.5				
Total	95.6	146.8				
Niue:						
July 13	2.5	0.5				
23	1.3	0.2				
31	0.7	0.3				
Aug. 7	0.5	0.2	1966	[1]		
14	0.9	0.4	1967	[1]		
21	4.0	34.7 (5)	1968	[1]		
23	5.9	28.5 (6)	1970	[1]		
Sep. 3	2.2	9.1 (8)	1971	[1]		
11	2.5	3.9 (27)	1972	6.3	17	0.2
18	3.1	0.9	1973	79.9	312	0.8
25	1.9	0.6				
Oct. 2	<0.1	0.4				
9	<0.1	0.2				
Total	25.6	79.9				

[1] See Report No. NRL-F/47.

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973 *(cont.)*

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km²)*	*Year*	*Total Deposition (mCi/km²)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Toriga:						
July 12	8.1	0.2				
13	0.4	< 0.1				
20	1.1	0.1				
27	0.5	< 0.1				
Aug. 3	0.9	0.3				
10	0.1	0.1				
17	0.6	0.2	1966	77.4	130	2.9
24	0.9	34.2 (7)	1967	21.5	102	0.8
31	0.9	3.8 (14)	1968	116.1	263	4.4
Sep. 7	10.4	4.0 (21)	1970	82.6	294	3.1
14	3.5	0.4	1971	53.2	95	2.0
21	6.2	0.5	1972	7.5	10	0.3
28	< 0.1	0.3	1973	95.3	213	1.0
Oct. 5	0.5	0.2				
12	0.4	0.2				
19	8.2	0.5				
24	2.1	0.2				
Total	44.8	95.3				
Aitutaki:						
July 12	0.3	0.1				
19	< 0.1	< 0.1				
26	0.2	0.2				
Aug. 2	21.4	2.0				
9	6.0	0.5				
16	0.3	140 (4) [1]	1966	[2]		
23	0.6	41.3 (4)	1967	[2]		
30	1.2	263 (4)	1968	[2]		
Sep. 6	1.7	88.2 (9)	1970	[2]		
13	1.2	1.1	1971	[2]		
20	0.7	1.3	1972	5.6	17	0.2
27	0.3	0.5	1973	540.1	1214	3.5
Oct. 4	0.9	0.9				
10	7.7	0.2				
17	0.3	0.2				
24	1.7	0.6				
Total	44.5	540.1				

[1] Deposition level adjusted to last day of collection (see Fig. 6).
[2] See Report No. NRL-F/47.

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973 *(cont.)*

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km²)*	*Year*	*Total Deposition (mCi/km²)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Rarotonga:						
July 12	1.0	0.1				
19	0.2	< 0.1				
26	0.6	< 0.1				
Aug. 2	7.5	0.2				
9	12.5	< 0.1				
16	0.2	N.S.	1966	[1]		
23	0.9	19.1 (7)	1967	[1]		
30	2.9	206 (4)	1968	[1]		
Sep. 6	0.7	14.3 (11)	1970	[1]		
13	1.5	3.3 (16)	1971	[1]		
20	1.6	1.6	1972	6.7	24	0.3
27	1.2	0.6	1973	247.2	570	1.6
Oct. 4	1.7	0.5				
10	9.6	0.8				
17	0.3	0.2				
24	1.0	0.3				
Total	43.4	247.2				
Auckland:						
July 13	0.4	< 0.1				
20	8.8	< 0.1				
27	0.3	< 0.1				
Aug. 3	2.4	0.1				
10	2.4	0.4				
17	3.2	0.1	1970	94.7	124	3.6
24	1.3	< 0.1	1971	78.2	155	3.0
31	2.2	0.2	1972	4.7	17	0.2
Sep. 7	2.4	< 0.1	1973	1.7	4	< 0.1
14	3.7	0.2				
21	4.6	0.1				
28	2.2	< 0.1				
Oct. 5	0.7	< 0.1				
12	2.0	< 0.1				
19	1.9	< 0.1				
26	0.4	< 0.1				
Total	38.9	1.7				

[1] See Report No. NRL-F/47.
N.S. No sample.

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973 *(cont.)*

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km²)*	*Year*	*Total Deposition (mCi/km²)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Wellington:						
July 13	1.2	< 0.1				
20	4.4	< 0.1				
27	0.2	< 0.1				
Aug. 3	2.2	< 0.1				
10	7.3	0.9				
17	4.1	0.3	1970	68.9	88	2.6
24	0.1	< 0.1	1971	59.4	80	2.3
31	1.4	0.1	1972	4.6	15	0.2
Sep. 7	1.5	< 0.1	1973	2.4	7	< 0.1
14	1.7	0.1				
21	1.9	< 0.1				
28	0.6	< 0.1				
Oct. 5	Nil	< 0.1				
12	2.3	0.1				
19	6.1	0.1				
26	0.7	0.2				
Total	35.7	2.4				
Greymouth:						
July 14	Nil	< 0.1				
21	1.4	< 0.1				
28	1.5	< 0.1				
Aug. 4	5.4	0.2				
11	7.8	0.6	1966	106.3	116	4.0
18	2.0	< 0.1	1967	37.4	63	1.4
25	3.7	0.1	1968	192.1	144	7.4
Sep. 1	5.8	0.1	1970	114.1	79	4.3
8	7.5	0.2	1971	76.9	72	2.9
15	2.1	< 0.1	1972	8.6	14	0.3
22	3.8	0.2	1973	2.6	5	< 0.1
Oct. 6	2.1	< 0.1				
13	3.2	0.2				
20	3.5	0.1				
27	5.1	0.2				
Total	54.9	2.6				

TABLE 4. TOTAL BETA ACTIVITY OF WEEKLY RAINWATER SAMPLES 1973 *(concl.)*

1973			*Summary and Comparison*			
Date	*Rain (cm)*	*Deposition (mCi/km²)*	*Year*	*Total Deposition (mCi/km²)*	*Average Concentration (pCi/litre)*	*Dose to Infinity (mRAD)*
Christchurch:						
July 13	1.0	< 0.1				
20	2.0	< 0.1				
27	0.6	< 0.1				
Aug. 3	8.1	< 0.1				
10	1.3	0.1	1966	28.2	106	1.1
17	1.7	0.1	1967	5.9	35	0.2
24	Nil	< 0.1	1968	21.7	123	0.8
31	6.3	< 0.1	1970	19.9	71	0.7
Sep. 7	2.9	0.1	1971	16.2	76	0.6
14	0.5	< 0.1	1972	2.3	19	< 0.1
21	0.2	< 0.1	1973	0.9	3	< 0.1
28	0.4	< 0.1				
Oct. 5	Nil	< 0.1				
12	0.3	< 0.1				
19	0.8	< 0.1				
26	Trace	< 0.1				
Total	26.1	0.9				

FIGURE 5. AVERAGE DAILY DEPOSITION OF FISSION PRODUCTS IN RAIN 1973

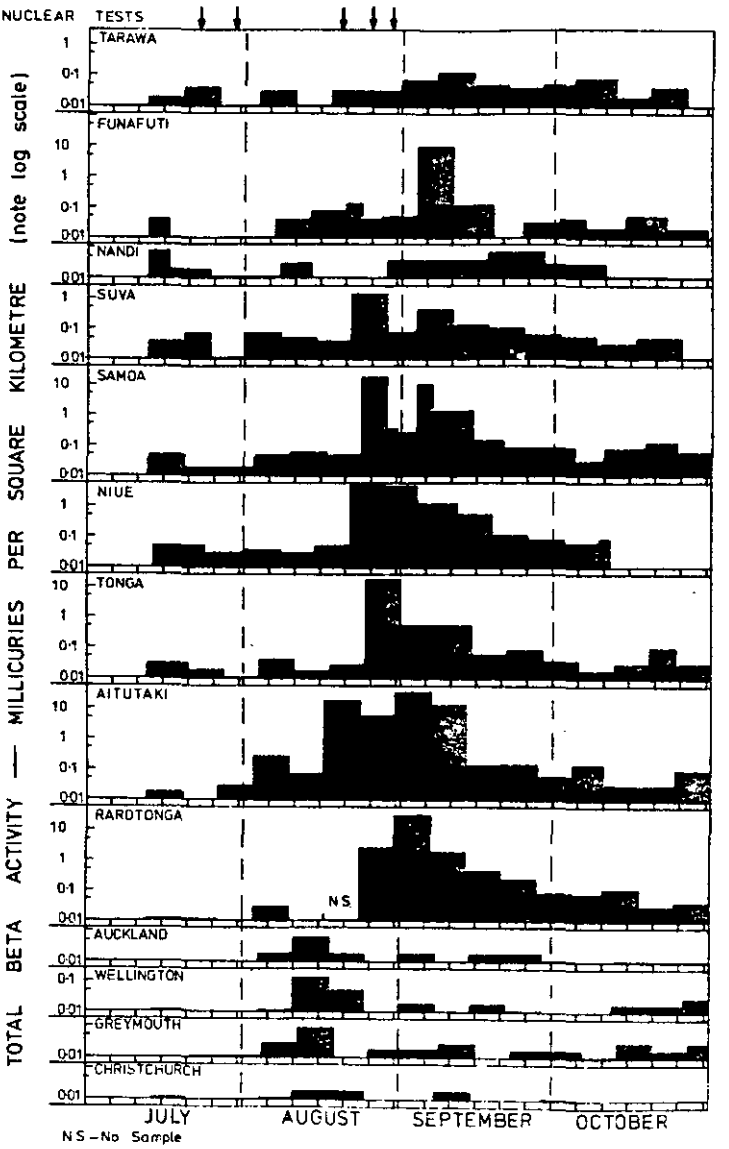


FIGURE 6. THE ORIGIN OF FRESH FISSION PRODUCTS IN RAINWATER SAMPLES 1973

(as determined by measurement of the rate of radioactive decay)

The vertical scale gives values of $A^{-0.833}$ where A is the relative activity of the samples at successive measurement times. The estimated time of origin is given by the point where the extrapolated line of best fit cuts the date axis.

The collection period is shown thus: ☂, and bomb tests thus: ☢.

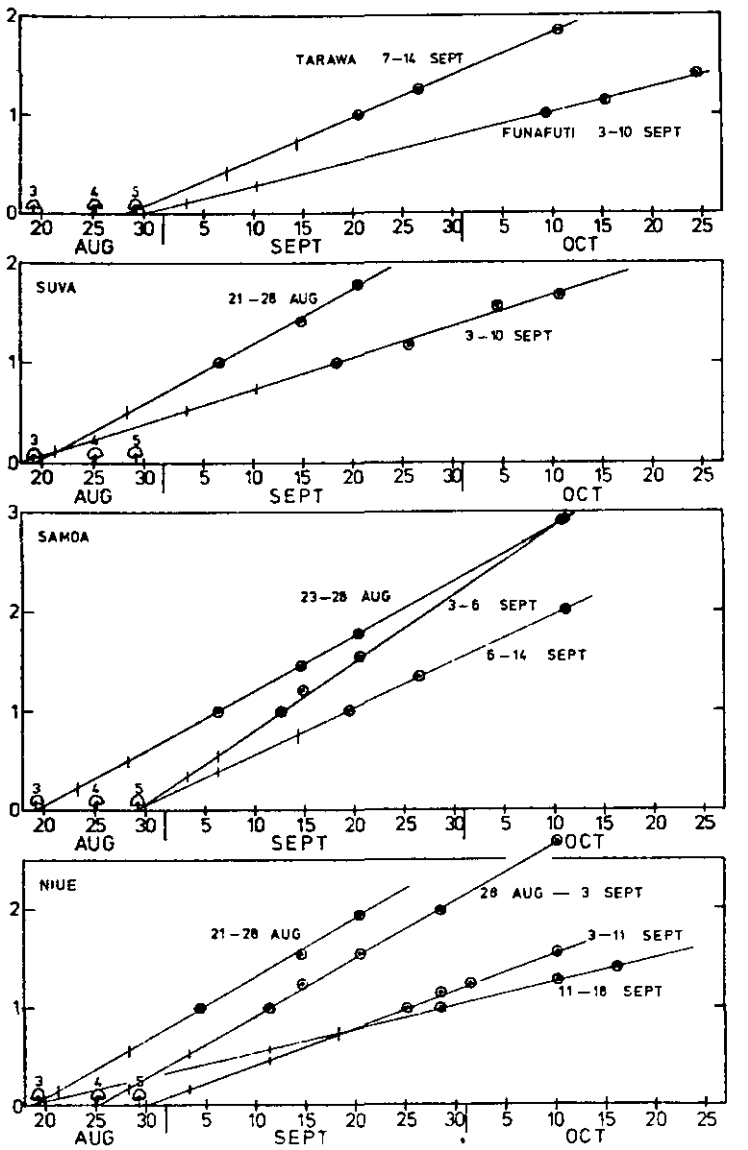


FIGURE 6. THE ORIGIN OF FRESH FISSION PRODUCTS IN RAINWATER SAMPLES 1973 *(concl.)*

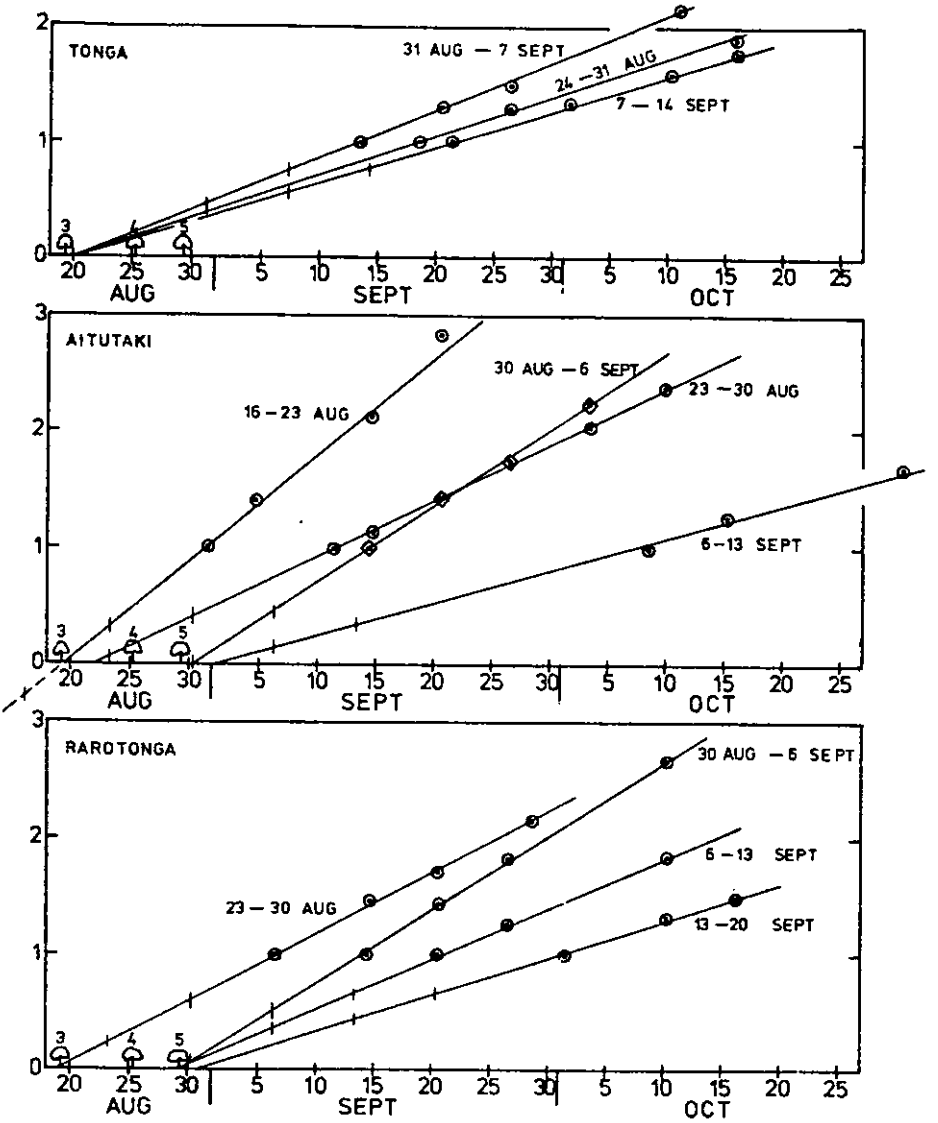


TABLE 5. IODINE-131 IN MILK 1973

Picocuries per Litre at Noon on Day of Collection

	New Zealand Stations[1]							*Pacific Islands*				
	AK	NP	WN	GM	CH	DN	IN	*Suva, Fiji*		*Apia, Samoa*	
								July 18	<2	July 13	<2
								20	<2	19	<2
								23	<2	21	<2
July 25	<2	<2	<2	<2	NS	<2	<2	25	<2	25	<2
25	<2	<2	<2	<2	<2	<2	NS	27	<2	26	<2
30	<2	<2	<2	<2	<2	<2	<2	30	<2	30	<2
Aug. 1	<2	<2	<2	<2	<2	<2	<2	Aug. 1	<2		
3	<2	<2	<2	<2	<2	<2	<2	3	<2	Aug. 3	<2
6	<2	<2	<2	<2	<2	<2	<2	6	NS		
8	<2	<2	<2	<2	<2	<2	NS	8	<2	8	<2
10	<2	<2	<2	<2	<2	NS	<2	10	<2	10	<2
13	<2	<2	<2	<2	<2	<2	<2	13	<2		
15	<2	2	<2	<2	<2	<2	<2	15	<2	15	<2
17	7	7	<2	3	<2	<2	<2	17	<2	17	<2
20	2	3	<2	2	<2	3	<2	20	3	21	<2
22	2	3	2	NS	<2	<2	<2	22	<2		
24	<2	2	2	4	2	3	<2	24	<2	24	<2
27	<2	<2	2	<2	<2	<2	<2	27	<2		
29	3	3	<2	NS	<2	2	<2	29	10	29	10
31	2	<2	<2	<2	<2	NS	2	31	11	31	36
Sep. 3	<2	2	<2	<2	<2	<2	<2	Sep. 3	8		
5	<2	<2	<2	<2	<2	<2	<2	5	6	Sep. 5	8
7	NS	<2	<2	<2	<2	<2	<2	7	6	7	88
10	<2	<2	<2	<2	<2	<2	<2	10	4		
12	<2	<2	<2	<2	<2	2	<2	12	11	12	48
14	<2	<2	<2	<2	<2	<2	<2	14	15	13	25
17	<2	<2	<2	NS	<2	<2	NS	17	13	15	56
19	<2	<2	<2	<2	<2	<2	<2	19	9	18	17
21	<2	<2	NS	<2	<2	<2	NS	21	5	22	24
24	<2	<2	<2	<2	<2	<2	NS	24	6	25	9
26	<2	<2	<2	<2	<2	<2	<2	26	3	27	6
28	NS	<2	<2	<2	<2	<2	<2	28	3	29	4
Oct. 1	NS	<2	<2	<2	<2	<2	<2	Oct. 1	3	Oct. 2	<2
3	NS	<2	<2	<2	<2	<2	<2	3	<2		
5	<2	<2	<2	<2	<2	<2	<2	5	<2	5	<2
8	<2	<2	<2	<2	<2	<2	<2	8	NS	9	4
10	<2	<2	<2	<2	<2	<2	<2	10	<2	11	<2
12	<2	<2	<2	<2		<2	<2	12	<2	13	<2
15			<2	<2			<2	15	<2	16	<2
								17	<2	18	<2
								19	<2		
								22	<2	23	<2
								24	<2	25	<2
								26	<2	27	<2
										30	<2
Average	<2	<2	<2	<2	<2	<2	<2		3		10

N.S. No sample.

[1] AK—Auckland; NP—New Plymouth; WN—Wellington; GM—Greymouth; CH—Christchurch; DN—Dunedin; IN—Invercargill.

FIGURE 7. IODINE-131 IN MILK DURING EACH MONITORING PROGRAMME SINCE 1966

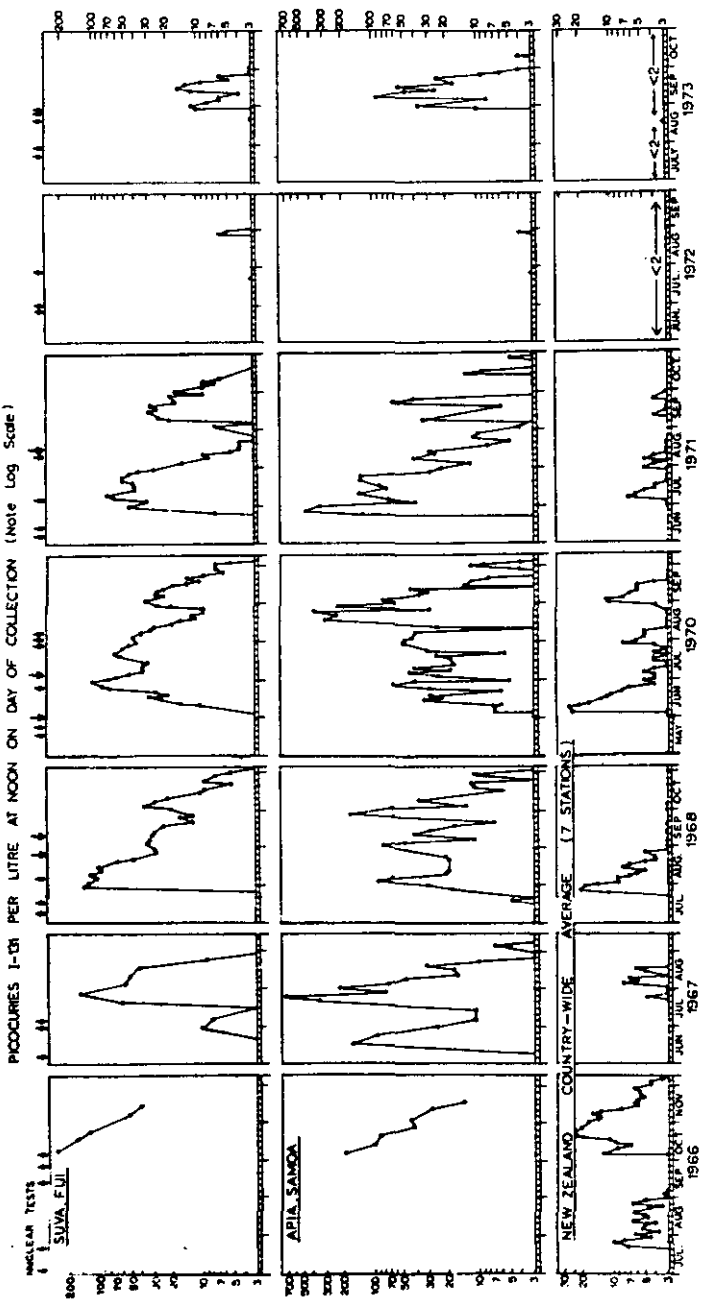


TABLE 6. IODINE-131 IN MILK 1966-1973: HAZARD ASSESSMENT

	Year	*New Zealand country-wide average*	*Suva, Fiji*	*Apia, Samoa*
Average level during the monitoring period (pCi/litre)	1966	7	(100)	(80)
	1967	< 5	23	68
	1968	5	36	28
	1970	5	25	43
	1971	2	18	47
	1972	< 2	< 2	< 2
	1973	< 2	3	10
Average level during the entire year (pCi/litre)	1966	4	(50)	(40)
	1967	1	8	23
	1968	2	12	9
	1970	2	10	17
	1971	1	8	20
	1972	< 1	< 1	< 1
	1973	< 1	< 1	3
% of reference level	1966	2%	(25%)	(20%)
	1967	< 1%	4%	11%
	1968	1%	6%	5%
	1970	1%	5%	9%
	1971	< 1%	4%	10%
	1972	< 1%	< 1%	< 1%
	1973	< 1%	< 1%	1%

Note: The values in brackets for Suva and Apia during 1966 are based on an extrapolation. See Report No. RNL-F/47.

LETTRE DU PRÉSIDENT DE LA RÉPUBLIQUE FRANÇAISE AU PREMIER MINISTRE DE LA NOUVELLE-ZÉLANDE, EN DATE DU 1er JUILLET 1974 [1]

Par votre lettre du 11 juin 1974, vous m'avez fait part de vos vues à la suite du communiqué officiel publié le 8 juin 1974 au sujet des essais nucléaires français dans le Pacifique. J'en ai pris connaissance et les ai étudiées avec l'attention que méritent les opinions du gouvernement d'un pays que, malgré les sentiments divergents sur cette affaire, la France considère comme une nation amie.

Les raisons qu'a le Gouvernement français de poursuivre le programme de mise au point d'une force de dissuasion sont bien connues et vous ont été exposées d'une façon détaillée. Elles demeurent à nos yeux valables. Je me permets d'insister sur le fait que, en agissant comme elles le font, les autorités françaises ne contreviennent pas au droit international, pas plus qu'elles ne portent atteinte à l'environnement ni à la santé des populations de la région.

Permettez-moi en particulier de rappeler les motifs pour lesquels la France ne s'estime pas liée par les ordonnances de la Cour internationale de Justice du 22 juin 1973, portant indication de mesures conservatoires. Elle avait en effet introduit dans sa déclaration d'acceptation de la compétence de la Cour une réserve catégorique à propos des différends concernant des activités se rapportant à la défense nationale. Cette réserve étant fort claire et l'incompétence de la Cour dans l'affaire des essais nucléaires étant donc manifeste, la France estime que les ordonnances du 22 juin 1973 sont dépourvues de base juridique. J'observe d'ailleurs que la Cour, en invoquant dans les ordonnances précitées l'article 41 de son Statut, a choisi une disposition qui ne confère aucun caractère obligatoire aux mesures conservatoires indiquées sur ce fondement.

De la même façon, permettez-moi de vous assurer que toutes précautions sont prises cette année, comme par le passé, pour que les tirs effectués aient lieu dans des conditions de sécurité totale et de vous rappeler que leur innocuité a été confirmée par les rapports du Comité scientifique des Nations Unies dont les conclusions sont régulièrement publiées.

Dans les circonstances actuelles, c'est du moins une satisfaction pour moi de noter que vous avez relevé de façon positive dans votre lettre l'annonce faite dans le communiqué du 8 juin 1974 du passage aux essais souterrains. Il y a là un élément nouveau dont je veux espérer que le Gouvernement néo-zélandais mesurera l'importance.

Je ne saurais terminer cette lettre sans vous exprimer mon intime conviction qu'en dépit de difficultés passagères les relations entre nos deux pays sont appelées à se développer encore, pour leur plus grand profit, sur la base de la compréhension et du respect mutuel.

(Signé) V. GISCARD D'ESTAING.

[1] Voir ci-dessus p. 260 et ci-après p. 425.