

RADIOLOGICAL MONITORING IN THE PALOMARES ZONE
PERIOD: SECOND HALF OF 1991

Translated for

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PERIOD: Second Half of 1991

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CIEMAT/IMA/UGIA/M5A01/03/92

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RADIOLOGICAL MONITORING IN THE PALOMARES ZONE

PERIOD: Second Half of 1991

Radiological monitoring was carried out in the Palomares zone during the second half of 1991, in accordance with the planning established in the report "RADIOLOGICAL MONITORING IN THE PALOMARES ZONE: PROGRAM FOR 1991". The following operations were conducted:

1. MONITORING OF PERSONS

The operations corresponding to this section were:

a) Execution of the second part of the survey campaign programmed for 1991.

b) Obtaining of pending results corresponding to the 1990 survey campaign.

c) Obtaining of results corresponding to the 1991 survey campaign.

The following subparagraphs reflect the contents of each of the cited activities.

1.1 SURVEYS 1991: OPERATIONS

Following the plan set forth in the report: "RADIOLOGICAL MONITORING IN THE PALOMARES ZONE: PROGRAM FOR 1991", referenced as CIEMAT/PRYMA/M5A01/PI002/91 and with the purpose of completing the survey of designated persons, the second part of the 1991 campaign has been conducted during this second half of the year.

This second campaign began on September 17, 1991 and ended on November 12 of that year, including a total of 90 persons distributed into the following previously defined and established priority groups:

	No. Persons
Group 1-A:	4
Group 1-B:	5
Group 1-C:	13
Group 2-A:	2
Group 2-B:	16
Group 2-C:	23

1.2 DOSIMETRY FOR 1990 (PARTIAL)

Of the total of 149 persons monitored in 1990, urinary Am-241 excretion analysis was completed on 39 persons, which completes the analyses corresponding to that year.

The other results were presented in earlier reports.

The results of the Am-241 determinations are:

- The 39 persons surveyed gave Am-241 values below the AMD of the analytical method (0.7 mBq / 24 hour urine).

Consequently, and as a summary of the results of the measurements taken in the 149 persons who were monitored during 1990, it can be stated that positive plutonium values have been determined in the urine of six of these persons, and positive values of Am-241 have been determined in none (See CIEMAT/IMA/UGIA/M5A01/03-91).

1.3 DOSIMETRY FOR 1991 (PARTIAL)

Of the total of 150 persons who were monitored in 1991, analysis of urinary excretion of Pu-239+Pu-240 was completed during this second half for 131. The remaining results, still in the process of being obtained, will be presented in the report for the second half of 1992.

The results of Pu-239 + Pu-240 determinations made in the urine of the mentioned 131 persons are:

- One person gave a result of Pu-239 + Pu-240 in the urine above the AMD of the analytical method. The value of the radioactivity concentration was 1.4 ± 0.3 mBq/24 hour urine.

This result was obtained from a 43-year old woman who was in Palomares at the time of the accident. The Pu-239 + Pu-240 radioactivity concentration values obtained in the four previous surveys undergone by this person had, in all cases, been below the minimum concentration detectable by our analytic method (0.7 mBq/24 hour urine).

- The other 130 persons gave Pu-239 + Pu-240 values below the AMD of the analytical method (0.7 mBq in 24 hour urine).

1.4 MEDICAL MONITORING

In this phase of the Radiological Monitoring Campaign in the Palomares Zone for 1991 (see Doc. CIEMAT/IMA/UGIA/M5A01/2/91), carried out during the period between 7/1/91 and 11/11/91, medical examinations were administered to 130 persons.

In these medical examinations, conducted in accordance with the directions contained in Safety Guide No. 7 "Bases for Medical Monitoring of Workers Exposed to Ionizing Radiation", the recommendations of international organizations and the provisions of the Medical Service Organization Manual (see Doc. SGT/SL/SM/029/91), no pathology was detected which might be attributable to the incorporation of transuranic elements coming from residual contamination of the zone.

We list below the significant findings:

Absence of alterations	17
Mild alterations	59
Presence of pathologies	54
1. INFECTIOUS AND PARASITIC DISEASES (001-139)*	
2. TUMORS (140-239)	
Uterine fibromyomatosis	1
3. DISEASES OF THE ENDOCRINE GLANDS, NUTRITION AND METABOLISM, AND IMMUNITY DISORDERS (240-279)	
Moderate obesity	21
Severe obesity	3
Hyperglycemia	16
Hypercholesterolemia	9
Hypertriglyceridemia	6
Mixed hyperlipoproteinemia	2
Type II diabetes mellitus	4
Goiter	4
Iatrogenic hypothyroidism	1

* ICD Code - 9th Revision.

4.	DISEASES OF THE BLOOD AND HEMATOPOIETIC ORGANS (280-289)	
	Microcritical anemia	7
	Anemia	1
	Eosinophilia	5
	Leukocytosis with neutrophilia	3
	Leukopenia with lymphocytosis	1
	Polyglobulia	1
	Thrombocytosis	3
5.	MENTAL DISORDERS (290-319)	
	Pathological anxiety	3
	Anxiety neurosis	3
	Depressive syndrome	4
	Insomnia	7
	Excessive use of alcohol	2
	Aerophagia	4
6.	DISEASES OF THE NERVOUS SYSTEM AND SENSORY ORGANS (320-389)	
	Migraine	2
	Astigmatism	5
	Presbyopia	7
	Myopia	5
	Pigmentary retinitis	1
	Color blindness	1
	Pterygium	1
	Acute unilateral loss of vision acuity	7
	Acute bilateral loss of vision acuity	27
	Hypoacusis	59
	Impacted cerumen	2
	Tinnitus	7
	Otalgia	2
	Meniere's vertigo	1
	Peripheral vertigo	5

7.	DISEASES OF THE CIRCULATORY SYSTEM (390-459)	
	Varicose veins of lower limbs	7
	Venous insufficiency EE II	2
	Hemorrhoids	1
	Arterial hypertension	6
	Sinusal bradycardia	2
	A-V union extrasystole	1
	Incomplete blockage, right branch	12
	Incomplete blockage, left branch	2
	First degree A-V blockage	1
	Pre-excitation syndrome	1
	Sinusal arrhythmia	1
	Hypertrophic myocardiopathy	1
8.	DISEASES OF THE RESPIRATORY SYSTEM (460-519)	
	Acute bronchitis	1
	Acute rhinopharyngitis	4
	Acute pharyngitis	1
	Sinusitis	1
	Chronic nasal obstruction	1
	Amygdaline hypertrophy	1
	Chronic obstructive pulmonary disease	1
9.	DISEASES OF THE DIGESTIVE SYSTEM (520-579)	
	Missing teeth	47
	Dental caries	29
	Gastric dyspepsia	18
	Gastralgia	3
	Constipation	23
	Labial leukoplakia	1
	Fat intolerance	1
	Abdominal hernia	1
10.	DISEASES OF THE GENITOURINARY SYSTEM (580-629)	
	Dysmenorrhea	8

Premenstrual stress syndrome	1
Microhematuria	27
Microscopic pyuria	3
Menorrhagia	1
Polymenorrhea	1
Repetitive cystitis	1
Fibrocystic mastopathy	1
Urinary infection	9
Leukorrhea	3
Proteinuria	1
Bacteriuria	1
11. PREGNANCY, CHILDBIRTH AND POST PARTUM COMPLICATIONS (630-676)	
12. DISEASES OF THE SKIN AND SUBCUTANEOUS CELLULAR TISSUE (680-709)	
Juvenile acne	7
Cystic acne	1
Hirsutism	1
Vulvar pruritus	4
Alopecia	1
Malar telangiectasis	1
Contact dermatitis	2
Primaveral urticaria	1
Facial dyschromia	1
Vitiligo	1
Actinic hyperkeratosis	2
Labial hyperkeratosis	1
13. DISEASES OF THE OSTEOMUSCULAR SYSTEM AND CONNECTIVE TISSUE (717-739)	
Arthralgia	5
Arthrosis	5
Scoliosis	6
Dorsal hyper[cifosis?]	1

Cervicalgia	4
Dorsalgia	3
Lumbalgia	6
Cervicoarthrosis	3
Dorsal spondyloarthrosis	1
Lumbosciatica	1
Tietze syndrome	1
Synovial cyst	1
Dupuytren's disease	1
Postpoliomyelitic muscular atrophy	1

14. POORLY DEFINED SIGNS, SYMPTOMS AND DISEASED CONDITIONS (780-799)

ECG. AI hypertrophy	1
ECG. VI hypertrophy	1
ECG. Left cavity hypertrophy	1
Spirometry. Diminished forced CV	1
Effort dyspnea	5
EE II paresthesia	6
Cardiac murmur	3
Cephalea	22
Asthenia	2
Anorexia	2
Syncope	1
Palpitations	9
Malleolar edema	4
Submaxillary adenopathies	1
Pyrosis	1
Disphonia	5
Glucosuria	1
Dysuria	3
Vesical tenesmus	2
[Polaqui?]uria	2
Nicturia	1
Elevated serum transaminase	7

Elevated serum gamma-GT	2
Elevated serum alkaline phosphatase	4

15. TRAUMATISM AND POISONING (800-999)

The findings described correspond to the pathology which we find on a daily basis in periodic preventive examinations of workers, both those who are, and are not exposed to ionizing radiation, and in our judgment there is no indication of any unhealthy condition specifically induced by radioactive agents.

2. MONITORING OF THE ENVIRONMENT

2.1 GROUND

The activities specified below have been conducted with relation to following ground contamination:

A plutonium determination in 24 samples of the ground surface layer (first five centimeters) taken from 15 equidistant (25 m) points located over the length of parcel 2-0, and 9 equidistant (also 25 m) points over the length of parcel 2-1, for a total of 48 analyses.

The corresponding results are shown in Tables 1 and 2. The results corresponding to the samples taken from points 8, 13, 14 and 15 of parcel 2-0 are still pending final measurement by alpha spectrometry, and will be presented in a future report.

These data reflect the surface concentrations of Pu-239+Pu-240 in parcels 2-0 and 2-1 after the remodeling operations this zone has undergone.

2.2 AIR

The following activities were carried out during the second half of 1991:

2.2.1 Sampling

Continuous weekly sampling has followed the method established in the report: M5A01/PI002/91, "RADIOLOGICAL MONITORING IN THE PALOMARES ZONE. PROGRAM FOR 1991" sent to the CSN, at the two stations which remain in operation. At these two stations, which correspond to references 2-1 and 2-2, 54 samples were

collected, with an air volume of approximately 10 000 m³ per sample.

At Station P, a small urban building, the full specified program could not be carried out because of a complaint filed with the town council of Cuevas de Almanzora about the persistent and continuous noise of this sampling device, which necessitated shutting it down in July 1990.

At present, attempts are being made to install a muffler which will cause the least possible loss of air volume and allow us to keep the sampler in operation.

2.2.2 Plutonium determination

The following air samples were analyzed radiochemically to determine their concentration of Pu-239+Pu-240:

- Station P: 8
- Station 2-1: 33
- Station 2-2: 52

The chemical treatments of the radioanalytical process were applied separately to each weekly sample, however the electrodeposits and subsequent measurement by alpha spectrometry were made on our monthly compounds.

Building P (urban zone)

Eight samples were taken during this six-month period, corresponding to the period November-December 1990.

The concentration levels of Pu-239+PU-240 corresponding to this period are shown on Table 3. These results complement those already presented in the report CIEMAT/IMA/UGIA/02/91, "Radiological Monitoring of the Palomares Zone. Report for the first half of 1991".

From the set of readings obtained in 1990, it is inferred that:

- The mean value of the plutonium concentration in the urban area of Palomares during 1990 was 7.2 $\mu\text{Bq}/\text{m}^3$.
- The range of plutonium concentrations in this urban zone during this six-month period has fluctuated between < .2 and 54.2 $\mu\text{Bq}/\text{m}^3$.

- Both the mean and maximum concentration of plutonium during this period of 1990 remained very far below the derived concentration in air ($5\ 900\ \mu\text{Bq}/\text{m}^3$) for Class Y plutonium compounds, as can be inferred from the limit value established by Spanish law (4) for annual incorporation by inhalation.

Building 2-1

There were 33 samples analyzed during this semester for the period April-December 1990.

Some of these samples are still pending final measurement by alpha spectrometry.

The data corresponding to air samples measured from this station 2-1 during this period of 1990 are shown on Table 3. These results complement those already presented in the report CIEMAT/-IMA/UGIA/02/91, "Radiological Monitoring of the Palomares Area. Report for the First Half of 1991".

It is inferred from these values that:

- The mean concentration of plutonium at Station 2-1 during 1990 was $6.6\ \mu\text{Bq}/\text{m}^3$.

- The weekly concentrations of plutonium at this station during 1990 were in the range of between 0.5 and $20.0\ \mu\text{Bq}/\text{m}^3$.

- Both the mean and maximum value of the weekly plutonium concentrations during 1990 were very much lower than the derived concentration in air, $5\ 900\ \mu\text{Bq}/\text{m}^3$, for Class Y plutonium compounds, as can be inferred from the limit value of annual incorporation by inhalation established by Spanish law (4).

Station 2-2

During this six-month period 52 samples corresponding to 1990 were analyzed. Five of these 52 samples are pending final measurement by alpha spectrometry.

The data corresponding to the remaining 47 samples of Station 2-2 during 1990 are presented on Table 3.

From these values it is inferred that:

- The mean concentration of plutonium at Station 2-2 during 1990 was $4.6\ \mu\text{Bq}/\text{m}^3$.

- The weekly concentrations of plutonium at this station

during 1990 were in the range of between 0.2 and 9.7 $\mu\text{Bq}/\text{m}^3$.

- Both the mean and maximum value of the weekly plutonium concentrations during 1990 were very much lower than the derived concentration in air, 5 900 $\mu\text{Bq}/\text{m}^3$, for Class Y plutonium compounds, as can be inferred from the limit value of annual incorporation by inhalation established by Spanish law (4).

2.2.3 Americium determination

The following air samples were analyzed radiochemically to determine their concentration of Am-241

- Station P: 30 samples from 1990 (March-November)
- Station 2-1: 42 samples from 1990 (January-November)

The chemical treatments of the radioanalytical process were applied separately to each weekly sample, however the electrodeposits and subsequent measurement by alpha spectrometry were made on the corresponding samples compounded at eight weeks.

Building P (urban zone)

The results of the 30 samples from 1990 corresponding to Station P which were analyzed and measured during this second half of the year are shown on Table 4. The remaining data pending final measurement by alpha spectrometry, will be presented in the next report.

From these results it is inferred that:

- The mean value of the Am-241 concentration in this zone during this period of 1990 has at all times been lower than the CMD of our analytical method, 0.2 $\mu\text{Bq}/\text{m}^3$.

Building 2-1

The results of the 42 samples from 1990, corresponding to Station 2-1 which were analyzed and measured during this second half of the year are shown on Table 4. The remaining data, pending final measurement by alpha spectrometry, will be presented in the next report.

It is inferred from these values that:

- The mean concentration of Am-241 in the air of this zone, during this period of 1990 was at all times lower than the CMD of our analytical method, 0.2 $\mu\text{Bq}/\text{m}^3$.

2.3 VEGETATION

The following activities have been carried out in this area:

2.3.1 Sampling

In accordance with the specifications established in report M5A01/PI002/91, "RADIOLOGICAL MONITORING IN THE PALOMARES ZONE. PROGRAM FOR 1991", we list below, the vegetation and cultivated product samples collected during this second half of 1991.

- 6 samples of tomatoes and 6 samples of tomato plants coming from parcels of Zones 2, 3, 5 and 5-3B. These were collected in November.

- 2 samples of pimientos and 2 of pimiento plants coming from Zones 2 and 3. These were collected during November.

- 1 sample of cauliflower leaves coming from a parcel located in Zone 5. They were collected in November.

2.3.2 Plutonium determination

During this period plutonium analyses were conducted on fourteen 1990 samples and sixteen from 1991. The final measurement was made by alpha spectrometry in 20 samples.

The samples analyzed this semester were broken down as follows by species and components:

- 3 tomato samples (1990).
- 3 eggplant samples (1990).
- 2 olive samples (1990).
- 6 pimiento samples (1991).
- 8 muskmelon samples (1991).
- 8 watermelon samples (1991).

The results of the analyses corresponding to the samples measured in this first [sic] six-month period are given on Tables 5 - 9 by the zone from, and the year in which taken.

The results of the samples taken in 1990 are complementary of those already presented in earlier reports: CIEMAT/PRYMA/M5A01/1- /91 "RADIOLOGICAL MONITORING IN THE PALOMARES ZONE (Report for the second half of 1990) and CIEMAT/PRYMA/M5A01/3/91 "RADIOLOGICAL

MONITORING IN THE PALOMARES ZONE (Report for the first half of 1991").

The most important considerations which can be inferred from these results are:

- The tomato, pimiento and eggplant fruits present no Pu-239+Pu-240 contamination. One samples [sic] of unwashed olives coming from Zone 2 presents a value of 0.07 Bq/Kg. This value is insignificant from the point of view of the risk involved, since the official limit for annual incorporation by ingestion of Class Y plutonium compounds is 200 000 Bq.

- In relation to the edible portion of the muskmelons, a melon sample from Zone 3, washed and unwashed, presented a plutonium concentration, respectively, of 0.07 and 0.08 Bq/Kg, values which are negligible for the reason mentioned above.

3. METEOROLOGY

During 1991, the weather station installed in Palomares has remained in operation. There is a detailed report of the "Palomares (Almeria) Weather Station - January-December 1991", published as an internal report "CIEMAT/UMA/UMAC/M5A01/-1/92".

4. PARTICIPANTS

Thev following CIEMAT personnel have participated in the activities which led to the acquisition of the data, specifications and conclusions set forth in this report:

Senior Technicians: Begoña Aceña, Angel Bellido, Santiago Castaño, María Asunción Espinosa, C. Emma Iranzo, Emilio Iranzo and José Gutierrez.

Technicians: Camila Blanco, Ludivina Borrego, Milagros Carmona, María del Carmen Guzman, Francisco Moreno, Mariano Moya y Carmen Barros, responsible for the transcription and preparation of this manuscript.

5. REFERENCES

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- (3) Vigilancia Radiológica en la zona de Palomares. Informe primer semestre 1991. Radiological Monitoring in the Palomares Zone. Report for first half of 1991. CIEMAT/PRYMA-/M5A01/PI003/91.
- (4) Reglamento sobre Protección Sanitaria contra Radiaciones ionizantes. B. O. E. Nos. 13, 15 of January 1988.

TABLE 1. CONCENTRATION OF PU-239+240 IN SURFACE
SOIL SAMPLES (Bq/gr)

SAMPLING DATE	PARCEL	ITEM NO	RADIOACTIVITY CONCENTRATION (Bq/gr)
July 1990			
	2-0	1	0.01 <u>±</u> 0.003
"	"	2	0.02 <u>±</u> 0.004
"	"	3	0.06 <u>±</u> 0.01
"	"	4	0.04 <u>±</u> 0.006
"	"	5	1.13 <u>±</u> 0.17
"	"	6	18.0 <u>±</u> 2.7
"	"	7	36.8 <u>±</u> 5.4
"	"	8	----
"	"	9	42.3 <u>±</u> 6.4
"	"	10	0.55 <u>±</u> 0.08
"	"	11	0.83 <u>±</u> 0.13
"	"	12	7.1 <u>±</u> 1.1

TABLE 2. CONCENTRATION OF PU-239+240 IN RADIOACTIVITY IN SURFACE
SOIL SAMPLES (Bq/gr)

SAMPLING DATE	PARCEL	ITEM NO	RADIOACTIVITY CONCENTRATION (Bq/gr)
July 1990			
	2-1	16	< LID
"	"	17	0.02 \pm 0.005
"	"	18	0.01 \pm 0.002
"	"	19	< LID
"	"	20	7.2 \pm 1.1
"	"	21	0.10 \pm 0.02
"	"	22	2.8 \pm 0.4
"	"	23	0.19 \pm 0.03
"	"	24	0.26 \pm 0.03

TABLE 3. CONCENTRATION OF PU-239+240 RADIOACTIVITY IN
PALOMARES AIR SAMPLES

CONCENTRATION OF PLUTONIUM 239 + 240 ($\mu\text{Bq}/\text{m}^3$)
PERIOD BUILDING P BUILDING 2-1 BUILDING 2-2
(Urban zone)

30-12-89	al ¹ 03-02-89		$0,8 \pm 0,20$	$1,5 \pm 0,45$
03-02-90	al 03-03-90		$1,1 \pm 0,25$	$7,3 \pm 1,28$
03-03-90	al 31-03-90		$0,5 \pm 0,16$	$0,8 \pm 0,21$
24-03-90	al 31-03-90	$0,7 \pm 0,17$		
31-03-90	al 04-05-90	$4,2 \pm 0,76$		
31-03-90	al 27-04-90		$2,3 \pm 0,48$	$5,3 \pm 0,90$
04-05-90	al 01-06-90	< LID		
27-04-90	al 25-05-90			$9,0 \pm 1,58$
27-04-90	al 01-06-90	$4,3 \pm 0,77$	$4,3 \pm 0,77$	
01-06-90	al 29-06-90	$1,1 \pm 0,19$	$17,8 \pm 2,94$	$7,7 \pm 1,31$
29-06-90	al 03-08-90	$2,9 \pm 0,48$		
03-08-90	al 31-08-90	$54,2 \pm 9,7$		$3,4 \pm 0,69$
31-08-90	al 28-09-90	$0,5 \pm 0,10$	$20,0 \pm 3,20$	< 0,2
28-09-90	al 02-11-90	$1,6 \pm 0,28$		$4,1 \pm 0,98$
02-11-90	al 30-11-90	$5,9 \pm 1,0$	$0,9 \pm 0,17$	$2,0 \pm 0,41$
30-11-90	al 28-12-90	$3,4 \pm 0,54$	$11,6 \pm 1,80$	$9,7 \pm 1,55$

KEY: 1) to.

TABLE 4. CONCENTRATION OF AMERICIUM-241 RADIOACTIVITY IN
PALOMARES AIR SAMPLES

CONCENTRATION OF AMERICIUM-241 ($\mu\text{Bq}/\text{m}^3$)

PERIOD (Urban zone)	BUILDING P	BUILDING 2-1
------------------------	------------	--------------

①		
30-12-89 al 03-03-90		< 0.2
03-03-90 al 27-04-90		< 0.2
24-03-90 al 04-05-90	< 0.2	
27-04-90 al 29-06-90		< 0.2
31-08-90 al 02-11-90	< 0.2	

KEY: 1) to.

TABLE 5. PLUTONIUM-239 CONTENT IN THE VEGETATION
OF AREA 2 DURING 1990

SAMPLING DATE	FARM	VEGETABLE		RADIOACTIVITY CONCENTRATION Bq/kg.
		Species	Part	
18-11-90	M.S.N	Olive	Leaves	
"	"	"	Fruit	0.07±0.014
18-11-90	M.P.P	Pimientos	Plant	
"	"	"	Fruit	< LID
"	"	"	Washed fruit	< LID
18-11-90	2-1 J.Z.T	Eggplant	Plant	0.57±0.090
"	"	"	Fruit	
"	"	"	Washed fruit	< LID

TABLE 6. PLUTONIUM-239 CONTENT IN THE VEGETATION
OF AREA 3 DURING 1990

SAMPLING DATE	FARM	VEGETABLE		RADIOACTIVITY CONCENTRATION Bq/kg.
		Species	Part	
18-11-90	3-1 D.S.C	Pimientos	Plant	0.06±0.010
"	"	"	Fruit	< LID
"	"	"	Washed fruit	< LID

TABLE 7. PLUTONIUM-239 CONTENT IN THE VEGETATION
OF PARCEL 5-3B DURING 1990

SAMPLING DATE	FARM	VEGETABLE		RADIOACTIVITY CONCENTRATION Bq/kg.
		Species	Part	
18-11-90	5-3B	Tomato	Plant	0.59±0.10
"	"	"	Fruit	< LID
"	"	"	Washed fruit	< LID

TABLE 8. PLUTONIUM-239 CONTENT IN THE VEGETATION
OF ZONE 2-0 DURING 1991

SAMPLING DATE	FARM	VEGETABLE		RADIOACTIVITY CONCENTRATION Bq/kg.
		Species	Part	
01-07-91	J.Z.T	Muskmelon	Rind	0.19±0.03
"	"			< LID

TABLE 9. PLUTONIUM-239 CONTENT IN THE VEGETATION
OF ZONE 3 DURING 1991

SAMPLING DATE	FARM	VEGETABLE		RADIOACTIVITY CONCENTRATION Bq/kg.
		Species	Part	
01-07-91	3-1 J.N.T	Muskmelon	Washed Rind	0.03 \pm 0.003
"	"	"	Rind	0.17 \pm 0.019
"	"	"	Fruit (rest)	0.08 \pm 0.015
"	"	"	Washed fruit	0.07 \pm 0.010