

ROUTING AND TRANSMITTAL SLIP

Date
10/29/91

J. Harvey

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Ann Collins, EH-10		
2. Tom McCarron, EH-10		
3. Geoff Judge, EH-10		
4. Lisa Tillman, PR-322.1		
5.		

<input checked="" type="checkbox"/> Action	File	Note and Return
<input checked="" type="checkbox"/> Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	<input checked="" type="checkbox"/> Signature
Coordination	Justify	

REMARKS

PR - EXTEND OTERO-HALL AGREEMENT WITH GOVERNMENT OF SPAIN AND INCREMENTALLY FUND AT \$500,000.

PLEASE HANDCARRY THROUGH THE PROCUREMENT SYSTEM FOLLOWING SIGNATURE.



DO NOT use this for

DOE Form AD-H32
(4-78)

FROM: (Name, org. s

Fran Kimball, EH-47

[Handwritten Signature]

Phone No.
3-4691

5041-102

* U.S. GPO: 1990 - 281-781

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

October 29, 1991

EH-411

Procurement Request - Extension of Otero-Hall Agreement

Lisa Tillman, PR-322.1

Due to the continuing nature of the Otero-Hall Agreement, it is imperative that this contract be extended to October 31, 1992. It is the intention of the Office of Health to extend the subject agreement 1 year and incrementally fund at \$500,000 to cover a portion of the past Department of Energy obligation.

Based on the Otero-Hall Agreement, and in view of our outstanding obligations, it is requested that the Controller be authorized to make payment to the Government of Spain, which will be handcarried by C. Rick Jones, Director, Office of Health Physics and Industrial Hygiene, EH-41, during his visit with the Spanish officials on November 25, 1991. Please forward the check to the following address:

C. Rick Jones, Director
Office of Health Physics
and Industrial Hygiene (EH-41)
U.S. Department of Energy
Washington, D.C. 20585

Thank you for your assistance.

/s/

Harry J. Pettengill
Deputy Assistant Secretary
for Health

2 Attachments

Distribution:

Subject
EH-40 RF
EH-41 RF
EH-411 RF
Scott RF

EH-411:Scott:jll:353-3889:10/15/91
Scott MAS 1991 disk: A:Otero

EH-411
*
RTBell
/ /91

EH-41
CRJ
CRJones
10/24/91

EH-40
HJP
HJPettengill
10/28/91

~~EH-41~~
Kimball
Kimball
10/23/91

EH-40
Fox
Fox
10/29/91

* previous concurrence still valid

Distribution:

Subject
EH-40 RF
EH-41 RF
EH-411 RF
Scott RF

EH-411:Scott:jll:353-3889:10/15/91
Scott MAS 1991 disk: A:Otero

EH-411

EH-41

EH-40

RTBell **RB**
10 /16 /91

CRJones
/ /91

HJPettengill
/ /91

*Add EH-41
Kimball*

*EH-40
Jof*

**U.S. Department of Energy
Procurement Request-Authorization**

Formerly PR-799A
(Previous editions are obsolete)

1. To Awarding Office Headquarters Procurement Operations, PR-30	3. PR Number 01-92 EP12126.001 4. Change/Correction to a PR in Process <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 5. If item 4 is Yes, Enter PR Correction Letter
---	---

2. From Initiating Office Office of Health, EH-40	6. <input type="checkbox"/> Acquisition <input checked="" type="checkbox"/> Assistance 7. Consistent with Principal Purpose of Program <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
--	---

8. Purpose of Acquisition (Check as many as apply) <input type="checkbox"/> Supplies <input type="checkbox"/> Research & Development <input type="checkbox"/> Construction <input type="checkbox"/> Advisory & Assistance Services <input type="checkbox"/> Architect/Engineer Services <input type="checkbox"/> Support Services <input checked="" type="checkbox"/> Other (Requires Description) <input type="checkbox"/> Support Services International Agreement	9. Description of Work/Purpose of Assistance Extend International Agreement w/the Spanish Government to 10/31/92 and incrementally fund. Has List of Sources Been Attached? <input type="checkbox"/> Yes <input type="checkbox"/> No
---	--

10. Name Spanish Government 10a. Division C.I.E.M.A.T. 12. Product or Service Code For Acquisition Actions Only 13. CFDA Number For Assistance Actions Only:	11. Address Ministry of Industry, Trade & Tourism Madrid, Spain ATTN: Otero-Hall Agreement Proposed Instrument: 14. Cooperative Agreement <input type="checkbox"/> 15. Grant <input type="checkbox"/>
16. OSTI Deliverable For All Actions 17. (Reserved) 18. Master BIN	19. Desired Award Date 11-01-91
20. Unsolicited Proposal Number 22. Government Property N F - Furnished, P - Purchased, B - Both, N - Not Involved	21. Project Number 92ES527

FINANCIAL DATA

23. Government Share \$500,000	24. Awardee Share	25. Total \$500,000
---------------------------------------	-------------------	----------------------------

FY FUNDS COMMITTED

26. Approp. Symbol	27. B&R Number	28. Dollar Amt.	29. Allotment	30. Object Class	31. AFP	32. CFA
89X0224.91	HA0118	\$500,000	CR2491	0250	EN-YA	

33. From Continuation Sheet 35. Total Funds This PR: \$500,000 Are These Annual Funds? <input type="checkbox"/> Yes <input type="checkbox"/> No	34. Project Period from 11-1-91 thru 10-31-92 36. For Assistance Actions Only: Budget Period from 11-1-91 thru 10-31-92
---	---

PROJECT MANAGER/INITIATOR

37. Name Harvey Scott	38. Signature <i>C. Rick Jones for</i>	39. Date 10-9-91	40. Office Code EH-40 41. FTS Telephone Number 233-5725
---------------------------------	---	----------------------------	--

PROGRAM OFFICIALS

We hereby certify that if the funds cited are Annual Funds, this is an appropriate use of the Annual Funds.

42. Reviewing Official's Name Harry Pettengill	43. Signature <i>Harry Pettengill</i>	44. Date 10/28/91
45. Budget Official's Name Geoff Judge	46. Signature	47. Date

CERTIFYING OFFICIAL, I hereby certify that the funds cited in item 35 are available.

48. Name	49. Signature	50. Date
----------	---------------	----------

51. Initiating Office/Local Office Use
[Signature] **C. Rick Jones, EH-41**

Distribute 5 copies to: Contracting Office (White), Data Entry Control Point (Blue), Controller (Pink), Initiating Office (Green), and Office of Small and Disadvantaged Business (Goldenrod).

Contracting Office (White)



COVER FAX SHEET

OFFICE OF WESTERN EUROPEAN AFFAIRS (EUR/WE)

(Spain)

TO: DOE - Rick Jones

FROM: FRANK FOULGER - (202) 647-1412 FAX: (202) 647-3459

SUBJECT: Project INDALE

REMARKS: Per our talk

FOR:

Clearance / /

Information / /

Per Request / /

Comment / /

Number of pages to follow 2

PRIORITY

UNCLASSIFIED

INCOMING

DEPARTMENT OF STATE
EUROPEAN AFFAIRSPAGE 01 OF 02 MADRID 1216# 00 OF 03 211713Z 054291 3824812
ACTION: SP (02)

MADRID 1216# 00 OF 03 211713Z 054291 3824812

INFO: WE (02) SOV (01) SOHL (01) RPE (02) EEC (02)
----- 22/1034Z A2 SS (TOTAL COPIES: 010)
ACTION EUR-00INFO LOG-00 ACDA-13 ADS-00 AMAD-01 CEQ-01 CIAE-00 DODE-00
EB-00 H-01 INRE-00 INR-01 IO-19 L-00 NRC-02
NSAE-00 NSCE-00 OES-00 OIG-02 PH-00 SNP-00 SP-00
SS-00 T-01 EPAE-00 /059W

-----A2AC37 212039Z 772 45

P 211709Z OCT 91
FM AMEMBASSY MADRID
TO SECSTATE WASHDC PRIORITY 8274
DOE WASHDC

UNCLAS MADRID 1216#

DEPT FOR EUR/WE-FOULGER

ENERGY DEPARTMENT FOR CODE EH-40 - DAS PETTENGILL

E.O. 12356 N/A
TAGS: TRGY, OSC1, PREL, KSCA, SP
SUBJECT: CONTINUED FUNDING FOR RADIOLOGICAL
MONITORING IN SPAINREFS: (A) LETTER EMBASSY-EUR/WE 7/3/91; (B) TELCONS
MORRIS (EMBASSY)-BELL (DOE) 8/16/91; 10/9/91.

SUMMARY

1. SPAIN AND THE U.S. HAVE COOPERATED IN RADIOLOGICAL MONITORING OF THE AREA AROUND PALOMARES WHERE A COLLISION BETWEEN TWO U.S. AIR FORCE PLANES IN 1966 CAUSED NUCLEAR CONTAMINATION FROM TWO BOMBS THAT FELL FROM THE WRECKAGE. A CHANGE IN RESPONSIBILITY FOR THE PROGRAM WITHIN THE U.S. DEPARTMENT OF ENERGY HAS CAUSED USG TO MISS CONTRIBUTIONS TO THE COOPERATIVE PROJECT. THIS MESSAGE OUTLINES THE BACKGROUND OF THE COOPERATION, URGES SETTLEMENT OF OUTSTANDING OBLIGATIONS AND OFFERS HELP IN NEGOTIATING ANY CONTINUATION OF THE COOPERATION.

BACKGROUND

2. FOLLOWING THE COLLISION OF A US AIR FORCE B-52 AND A KC-135 OVER PALOMARES, SPAIN, IN 1966, USG THROUGH DOE HAS ASSISTED SPAIN WITH RADIOLOGICAL MONITORING OF THE AREA WHERE NUCLEAR MATERIAL, MAINLY PLUTONIUM, WAS SCATTERED. MATERIAL CAME FROM TWO NUCLEAR BOMBS THAT FELL FROM THE WRECKAGE, ALTHOUGH THE EXPLOSIONS WERE NONNUCLEAR, THEY NEVERTHELESS RELEASED CONSIDERABLE RADIOACTIVE MATERIAL IN THE AREA, MOST OF WHICH WAS SUBSEQUENTLY CLEANED UP BY THE USG. TWO OTHER BOMBS THAT FELL DID NOT GO OFF.

3. PROVISION FOR USG ASSISTANCE IS INCORPORATED IN

AN AGREEMENT BETWEEN THE U.S. ATOMIC ENERGY COMMISSION AND THE JUNTA DE ENERGIA NUCLEAR (NUCLEAR ENERGY BOARD), MINISTRY OF INDUSTRY AND ENERGY,

SIGNED FEBRUARY 1966 BY JOHN A. HALL, ASSISTANT GENERAL MANAGER FOR INTERNATIONAL ACTIVITIES, AEC, AND JOSE MARIA OTERO NAVASCUES OF THE JUNTA. THE AGREEMENT IS REFERRED TO AS THE OTERO-HALL AGREEMENT. THE SUCCESSOR TO THE AEC IN THE U.S. IS THE DEPARTMENT OF ENERGY, AND THE SUCCESSOR TO THE JUNTA DE ENERGIA NUCLEAR IS THE CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS - CIEMAT (CENTER FOR ENERGY, ENVIRONMENT AND TECHNOLOGY RESEARCH), IN THE MINISTRY OF INDUSTRY, TRADE AND TOURISM.

4. THE OTERO-HALL AGREEMENT IS OPEN-ENDED AND CALLS FOR JOINT EFFORTS TO MEASURE UPTAKE AND RETENTION OF PLUTONIUM AND URANIUM BY THE POPULATION; MEASUREMENT OF CONCENTRATION OF PLUTONIUM IN THE AIR; DETERMINATION OF CONTAMINATION LEVELS IN AGRICULTURAL PRODUCTS AND MIGRATION OF PLUTONIUM OXIDE IN THE SOIL. IN PARTICULAR, THE UNITED STATES WAS TO TAKE CERTAIN ACTIONS DURING THE FIRST YEAR, AND THERE WERE THEN OUTLINED STEPS TO BE TAKEN IN SUBSEQUENT YEARS. THE TEXT OF THE RELEVANT PARAGRAPH:

"CONTINUED PROVISION, BEYOND THE FIRST YEAR, OF SPECIALIZED EQUIPMENT, TECHNICAL ASSISTANCE AND ADVICE FOR AS LONG AS BOTH PARTIES MUTUALLY AGREE TO BE DESIRABLE ON THE BASIS OF THE OBSERVATIONS AS THEY ARE OBTAINED."

EXECUTION OF THE OTERO-HALL AGREEMENT WAS CALLED PROJECT INDALO, AFTER PREHISTORIC STICK FIGURES FOUND IN CAVE PAINTINGS NEAR PALOMARES.

5. THE EMBASSY'S RECORDS ARE INCOMPLETE, BUT IT APPEARS THAT AEC/DOE ADVANCED GOS OVER \$500,000 UP TO ABOUT 1980 AND CONTINUED FUNDING UNTIL THE MID OR LATE 1980S. WE RECKON THIS TO BE ABOUT 15-20 PERCENT OF THE TOTAL MONITORING COSTS.

RECENT DEVELOPMENTS

6. AT THEIR REQUEST GABRIEL MAGANTO AND JOSE GUTIERREZ OF CIEMAT CALLED ON THE EMBASSY SCIENCE COUNSELOR JULY 3, 1991. THEY BROUGHT WITH THEM COPIES OF CORRESPONDENCE BETWEEN CIEMAT AND DOE OVER THE PERIOD APRIL 5, 1989, TO AUGUST 7, 1990 (REF. A). CENTRAL DOCUMENTS WERE TWO "AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT" STANDARD FORMS 30. THESE PERTAIN TO CONTRACT NUMBER DE-G101-82EP12126 AND APPEAR TO BE EXTENSIONS OF THE FIRST OTERO-HALL AGREEMENT CONTRACT DATING FROM FEBRUARY 26, 1966. FUNDS TO BE OBLIGATED ARE \$200,000 IN THE DOCUMENT OF APRIL 5, 1989, RETURNED TO DOE OFFICE OF PROCUREMENT OPERATIONS; ATT: MS LISA

TILLMAN, PR-541, ROOM 1J-027, 1000 INDEPENDENCE AVE., SW, WASHINGTON DC 20585.

7. THE CORRESPONDENCE INDICATES EXTENDED DISCONNECTS AS SPANISH QUESTIONS WENT UNANSWERED AND DISBURSEMENTS WENT UNMADE. A LETTER FROM CIEMAT DATED JULY 6, 1990, REMINDS DOE THAT NO FUNDS HAD BEEN RECEIVED FOR THE PREVIOUS TWO FISCAL YEARS, PRESUMABLY \$100,000 EACH YEAR. CHESTER R. RICHMOND OF DOE'S OAK RIDGE NATIONAL LABORATORY ANSWERED THIS

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

DEPARTMENT OF STATE
EUROPEAN AFFAIRS

PAGE 02 OF 02 MADRID 12160 00 OF 03 211713Z 054291 S024012
LETTER ON AUGUST 7, 1990, AND EXPLAINED THAT A CHANGE OF RESPONSIBILITY FROM DEFENSE PROGRAMS TO ENVIRONMENT, SAFETY AND HEALTH (ESH) WITHIN DOE HAD BEEN CANCELLED, AND THAT RESPONSIBILITY WOULD STAY WITH THE LATTER DIVISION. RICHMOND SAID HE HAD BRIEFED ESH ON CIEMAT'S ROLE IN PROJECT INDALO IN JULY 1990 AND ANTICIPATED AN EARLY MEETING BETWEEN THE PARTIES.

MADRID 12160 00 OF 03 211713Z 054291 S024012
PROGRAM, NATURALLY TAKING INTO ACCOUNT ANY DIFFERENT PRIORITIES OF EHS IN ITS ROLE AS NEW PARTNER. THE EMBASSY STANDS READY TO ASSIST.

ZAPPALA

8. IN A LETTER DATED JULY 8, 1991, HENRY J. PETTENGILL, DOE DAS FOR HEALTH IN ESH, WROTE EUR/VE (FOULGER) IN THE DEPARTMENT TO CONFIRM THE TRANSFER OF RESPONSIBILITY FOR PROJECT INDALO IN DOE TO THE ESH DIVISION. IN THIS LETTER HE PROPOSED WORKING OUT A FIVE-YEAR PLAN WITH SPAIN ON DECONTAMINATION AND RADIOLOGICAL SAMPLING. HE ALSO MENTIONED THAT PREVIOUS REASSIGNMENTS OF PROJECT RESPONSIBILITY HAD RESULTED IN A LACK OF CONTINUED FUNDING FOR FOUR OF THE PREVIOUS FIVE YEARS. AT THE SAME TIME, PETTENGILL PROPOSED TO EXECUTE IN AUGUST 1991 A FUNDING TRANSFER TO CIEMAT.

CURRENT SITUATION

9. TELEPHONE CONVERSATIONS BETWEEN THE EMBASSY AND DOE (REF. B) CONFIRMED DOE'S INTEREST IN BOTH SETTLING PERCEIVED OUTSTANDING OBLIGATIONS AND PLANNING FOR FUTURE COOPERATION. DOE'S BELL ALSO INDICATED THAT AN EHS OFFICIAL WOULD BE IN EUROPE IN NOVEMBER AND WOULD LIKE TO PURSUE THE ISSUES DIRECTLY AT THAT TIME WITH CIEMAT AND THE EMBASSY. EMBASSY HAS SINCE BEEN IN TOUCH WITH CIEMAT, WHICH WELCOMES ANY VISITS AND DISCUSSIONS AND IS WILLING TO LAY OUT ITS PLANS AND PROPOSALS FOR THE FUTURE AS A BASIS FOR FURTHER COOPERATION.

10. COMMENT: THE EMBASSY BELIEVES THAT THE ISSUES ARE TWO: SETTLEMENT OF PAST OBLIGATIONS BY DOE, AND PREPARING FOR POSSIBLE FUTURE COOPERATION. ESSENTIALLY, THEY ARE NOT CONNECTED. DELAYS IN PAYING WHAT APPEAR TO BE OBLIGATIONS GOING BACK SEVERAL YEARS, EVEN IF THEY WERE MADE BY ANOTHER DIVISION THAN THE ONE THAT NOW HAS RESPONSIBILITY IN DOE, SEEM LENGTHY IN VIEW OF THE CORRESPONDENCE AMONG CIEMAT, DOE, RICHMOND AND PETTENGILL. PROMPT SETTLEMENT OF THESE OBLIGATIONS APPEARS INDICATED REGARDLESS OF THE FUTURE COURSE OF COOPERATION THAT MAY BE MUTUALLY WORKED OUT IN NOVEMBER OR LATER.

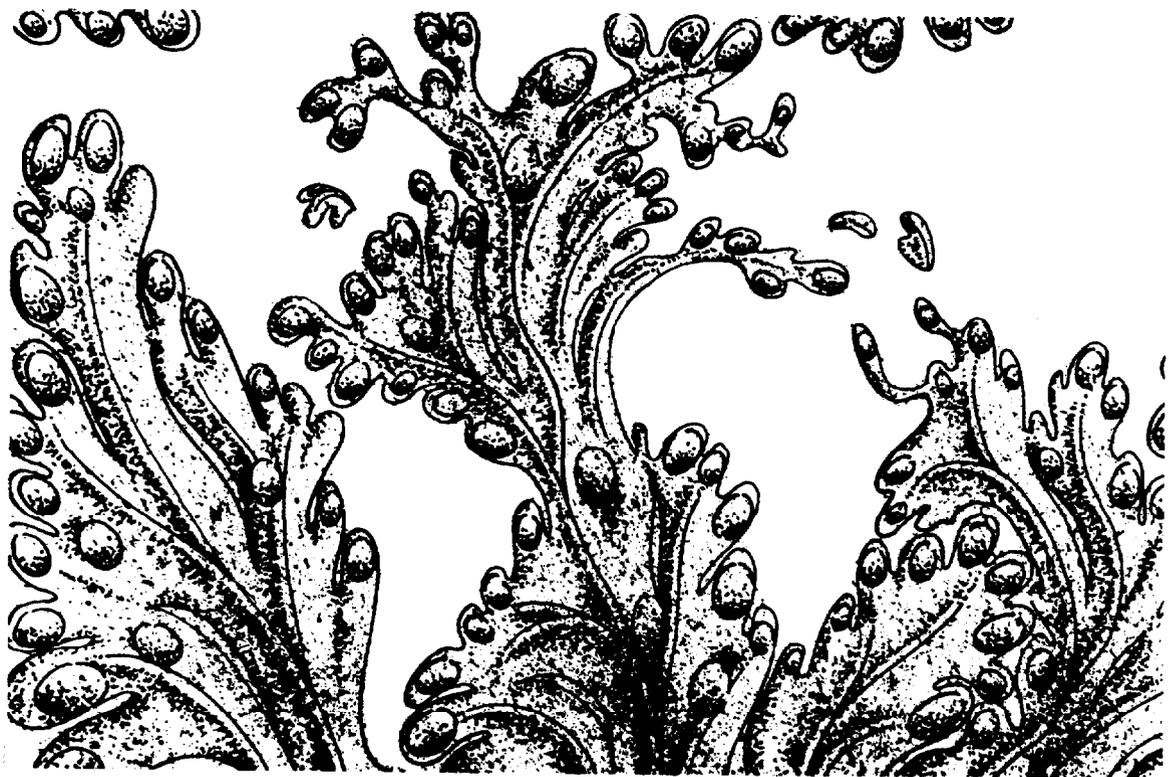
LINGERING SENSITIVITY OF THE WHOLE SUBJECT OF PALOMARES WARRANTS KEEPING FOLLOW-UP ACTIVITIES BUSINESSLIKE AND OBJECTIVE AT THE TECHNICAL, COOPERATIVE LEVEL. NEITHER SIDE HAS ANYTHING TO GAIN IF THE ISSUE SHOULD BECOME A POLITICAL ONE AT A TIME WHEN OVERALL POLITICAL RELATIONS BETWEEN THE U.S. AND SPAIN ARE AT SUCH A HIGH LEVEL. END COMMENT.

11. SUGGESTED COURSE OF ACTION: PROMPT COMPLIANCE WITH PETTENGILL'S INDICATION THAT FUNDS WOULD BE TRANSFERRED FOR PREVIOUS OBLIGATIONS BY AUGUST 31, 1991, APPEARS TO BE IN ORDER. PREFERABLY THIS SHOULD BE DONE BEFORE ANY VISIT BY DOE-EHS OFFICIALS, SO AS NOT TO MAKE IT APPEAR AS A BARGAINING CHIP. AFTER THIS CLEAR COMMITMENT, DOE SHOULD BE POSITIONED TO NEGOTIATE WITH CIEMAT IN GOOD FAITH OVER ANY FUTURE

UNCLASSIFIED

Radionuclides in the Study of Marine Processes

Edited by
P.J. Kershaw and D.S. Woodhead



ELSEVIER APPLIED SCIENCE

TRANSURANICS CONTRIBUTION OFF PALOMARES COAST: TRACING HISTORY
AND ROUTES TO THE MARINE ENVIRONMENT

L.Romero, A.M.Lobo, E.Holm¹ and J.A.Sánchez²

PRYMA-CIEMAT, Av.Complutense 22, 28040-Madrid SPAIN

¹Department of Radiation Physics, Lund University SWEDEN

²Dept.Física de las Radiaciones, UAB, Barcelona SPAIN

ABSTRACT

Following the Palomares accident, 1966, a land monitoring program has been running up to now. The study of the possible transfer of the residual transuranics contamination on land to the marine environment began in 1986, under a project sponsored by CEE. This paper presents the use of artificial and natural radionuclides as valuable tools for the evaluation of the possible pathways by which the transfer to Mediterranean sea could occur.

INTRODUCTION

The major source of transuranium elements to the Mediterranean Sea is fallout from nuclear weapons tests. Minor contributions originate from runoff from rivers contaminated by nuclear facilities. The eventual contribution from the Palomares accident (southern coast of Spain) in 1966, began to be studied in 1986 under a project sponsored by CEE focused on the depositional history recorded in sediments.

The Palomares accident occurred during a mid-air refueling operation of two USAF planes, one of them was carrying four thermonuclear bombs. Two of the bombs whose parachutes did not deploy experienced non-nuclear explosion, resulting in the spreading of their fissile material; a land area of 2.3 km² was contaminated with transuranic elements. After the remedial operations a transuranics contamination remained in the area.

Previous conclusions on the land to sea transfer of this contamination stated that it was mainly confined to an area south of the mouth of the Almanzora river (see Fig.1) [1]. To evaluate inventories and distribution of the transferred contamination, additional sediment samples were analyzed. During the analysis three hot particles were found at different locations.

^{210}Pb dating and artificial radionuclide ratios (^{137}Cs , ^{238}Pu , $^{239+240}\text{Pu}$, ^{241}Pu and ^{241}Am) were employed to investigate the possible pathways of the transfer of transuranics from land to sea.

MATERIALS AND METHODS

Sediment samples were collected using a box-corer during a sampling expedition in 1985, surveying the Vera Gulf (Southeastern Spanish coast, Fig. 1). Cores were extruded in 1 cm thick slices, discarding the outer centimetre of each section to avoid the mixing of contiguous sections. The samples were dried at 110°C to constant weight, ball-milled and sieved through 1 mm mesh size for radionuclide analysis. This paper presents the results for three sediment cores collected at the continental shelf and deep sea floor.

Samples were analyzed by gamma spectrometry and radiochemically treated to obtain the plutonium and americium activities.

A 45 g aliquot of each section was measured by gamma spectrometry. The use of a coaxial hyperpure n-type germanium detector allows the simultaneous determination of a wide range of gamma emitters [2] (from ^{210}Pb , $E=46.5$ keV to ^{40}K , $E=1461$ keV). Self-absorption effects were considered by using sediments with similar texture as the calibration samples; besides, the transmission method [3] was applied to ensure the equivalence between problem and calibration samples.

Briefly, Pu and Am were extracted from sediment by acid leaching and separated by sequential ion-exchange steps [4]. The isolated radionuclides were electroplated onto stainless steel discs and counted by alpha spectrometry with Silicon Surface Barrier detectors. Radiochemical yield was determined by using ^{242}Pu and ^{243}Am as tracers.

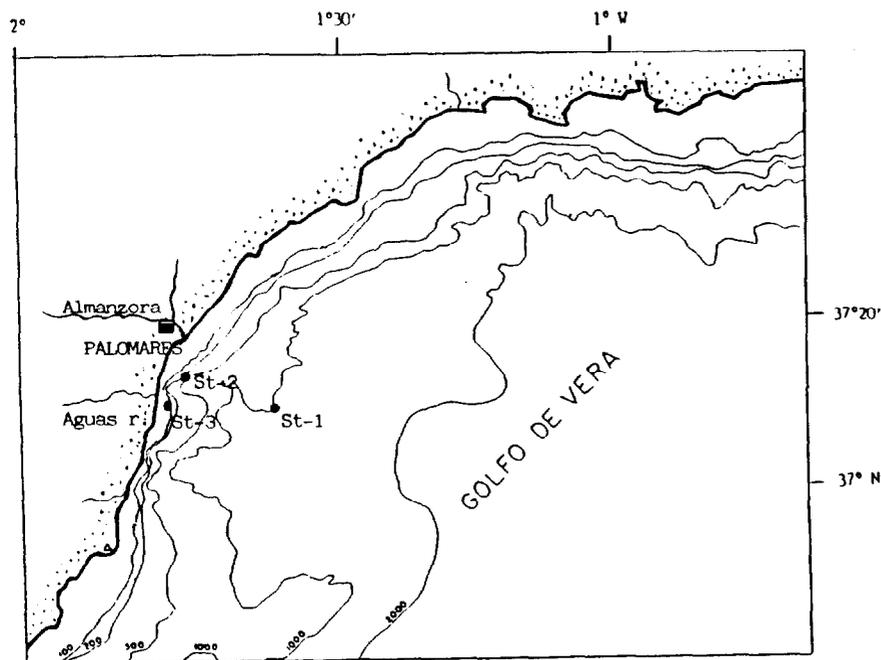


Figure 1. Map of the sampling area.

The accuracy of both alpha and gamma measurements was checked by participating in IAEA intercomparison exercises.

^{241}Pu was determined in only a few samples. The plutonium electroplated disk is directly measured in a low background liquid scintillation counter in order to record the low energy beta spectrum of ^{241}Pu [5].

The chronology of sediment cores was obtained by applying the CRS model [6] to unsupported ^{210}Pb profiles. The unsupported ^{210}Pb values in each core section were obtained by subtracting

the ^{226}Ra concentration from the total ^{210}Pb . Fig.2 shows the different profiles so obtained in cores St-1 (1000 m depth) and St-2 (94 m). This latter presents discontinuous ^{210}Pb values, due to its proximity to the coast (resuspension phenomena) and also to the intermittent supply of fluvial sediments by the Almanzor river (which is a seasonal river).

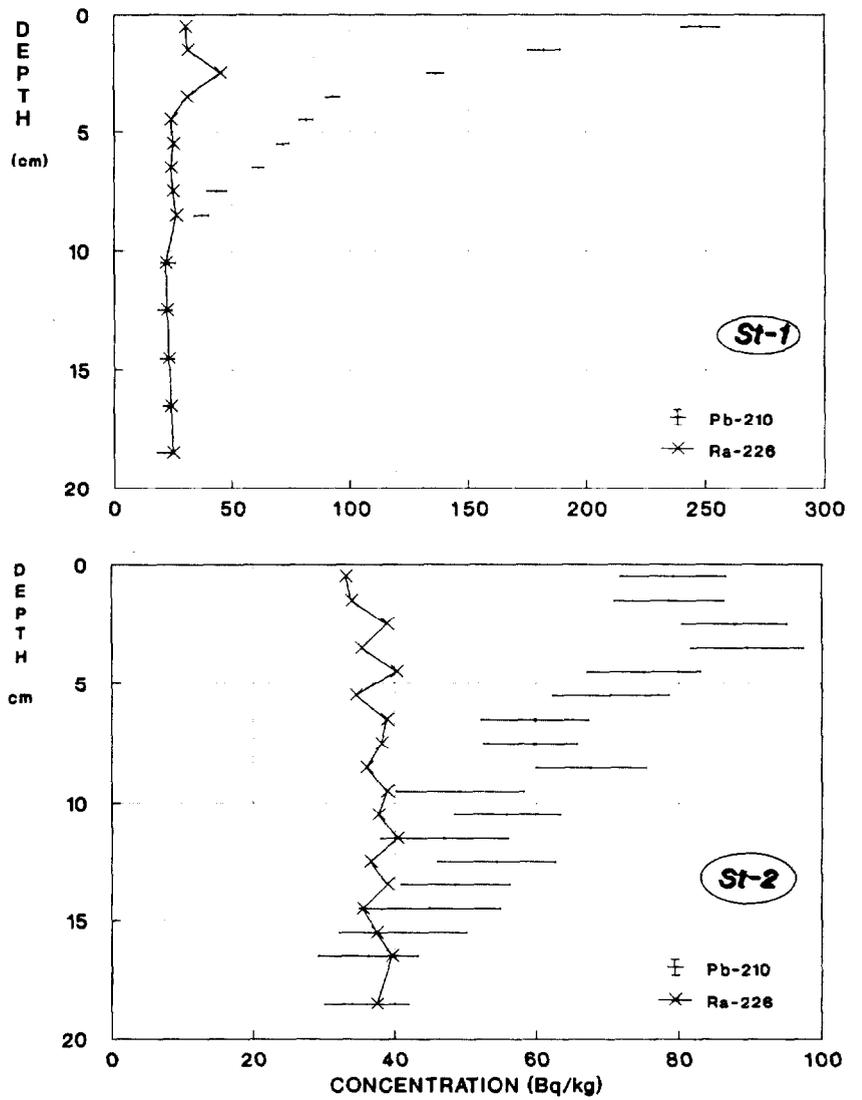


Figure 2. ^{226}Ra and total ^{210}Pb profiles in Cores St-1 and St-2

RESULTS

To evaluate the pathways of the transfer of transuranics from land to sea, as consequence of the referred accident, the chronologies of the sediment cores were identified and the isotopic ratios of Pu were used in order to characterize the sources of this contribution.

During these analysis a hot particle was found at 1000 m depth, far from the point of impact, 20 km approximately. This fact has been observed before at the Thule accident, 1968, where hot particles were found up to 45 km from the point of impact [7]. The detailed study on this sediment core, St-1, has been published elsewhere [8]. Also the ^{241}Pu activity has been determined for this particle. The total activities of the isolated fraction (2.75 g) were the following:

$^{239+240}\text{Pu}$:	21.7	±	1.1	Bq
^{238}Pu	:	0.431	±	0.050	Bq
^{241}Pu	:	31.2	±	9.8	Bq
^{241}Am	:	9.70	±	0.76	Bq

The activity ratios $^{238}\text{Pu}/^{239+240}\text{Pu}$ and $^{241}\text{Pu}/^{239+240}\text{Pu}$ correspond to typical values for weapons grade Pu [7], but the $^{241}\text{Am}/^{239+240}\text{Pu}$ ratio corresponds more to that found today in integrated nuclear test fallout after build up from ^{241}Pu .

The dating results of this core are shown in Table 1. The core St-1 presents a very low sedimentation rate and dates the second centimetre, where the hot particle was found, to 1967 with an uncertainty ranging from 1966 to 1969. It could be deduced that this particle was transported by aeolian distribution at the time of the accident. The isotopic ratios $^{241}\text{Pu}/^{239+240}\text{Pu}$ and $^{238}\text{Pu}/^{239+240}\text{Pu}$, (see Table 4) confirm this assumption.

Analysis of duplicate samples [9] showed two new hot particles at the continental shelf, south of the Almanzora river mouth. The concentrations of ^{137}Cs and unsupported ^{210}Pb as well as

the dating results of cores, St-2 and St-3, are listed in Tables 2 and 3.

TABLE 1
Dating results of core St-1. Coordinates 37°09.0 N 01°36.8 W;
depth 1000 m.

SECTION (cm)	¹³⁷ Cs Bq/kg ± 1σ	²¹⁰ Pb _{ex}	DATE	Sed.rate g/cm ² y
0-1	9.18 ± 0.42	255. ± 11.	1975 (1974-76)	0.058
1-2	5.22 ± 0.27	172. ± 8.0	1967 (1966-69)	0.064
2-3	3.77 ± 0.25	104.1 ± 4.4	1957 (1954-59)	0.080
3-4	2.43 ± 0.22	71.8 ± 3.6	1948 (1945-51)	0.085
4-5	2.02 ± 0.22	65.6 ± 3.3	1937 (1933-41)	0.069
5-6	1.12 ± 0.23	53.5 ± 3.1	1923 (1918-30)	0.058
6-7	1.17 ± 0.19	43.1 ± 2.8	1901 (1891-16)	0.042
7-8	< 0.6	21.9 ± 5.0	1883 (1866-20)	0.043
8-9	< 0.6	13.5 ± 3.6	-	-
9-10	< 0.6	8.3 ± 3.5	-	-
10-11	< 0.6	3.1 ± 3.5	-	-
11-12	< 0.6	1.7 ± 3.5	-	-

The cores closer to the coast at the continental shelf in the southern part of Almanzora river mouth have higher sedimentation rates, being lower for St-2 than St-3. This latter one receives the terrigenous outflow from two rivers, the Almanzora and the Aguas (see Fig.1) which leads to an increase in sedimentary deposited material.

The 10 g of sediment sample from core St-2, were the particle was found, have the following activities:

$$^{239+240}\text{Pu} : 0.625 \pm 0.037 \text{ Bq}$$

$$^{238}\text{Pu} : 0.0175 \pm 0.0021 \text{ Bq}$$

The chronology obtained to the St-2 core dates the first centimetre at 1981, ranging between 1977 and 1986. The pathway for this hot particle could be via an extensive big flood occurred in 1973 at the Almanzora river, which could have washed out the contaminated river bed and remainder contamination at

river surroundings, later to be deposited by descending currents. The higher value of sedimentation rate obtained to this core section confirms the assumption.

TABLE 2

Dating results of core St-2. Coordinates 37°10.7 N 01°46.3 W; depth 94 m.

SECTION (cm)	¹³⁷ Cs Bq/kg ± 1σ	²¹⁰ Pb _{ex}	DATE	Sed.rate g/cm ² y
0-1	4.85 ± 0.46	49.7 ± 8.1	1981 (1977-86)	0.314
1-2	5.59 ± 0.50	48.2 ± 8.4	1978 (1973-83)	0.290
2-3	6.52 ± 0.49	52.7 ± 8.1	1973 (1968-79)	0.234
3-4	7.32 ± 0.52	58.5 ± 8.6	1967 (1962-74)	0.179
4-5	6.69 ± 0.48	37.6 ± 8.6	1962 (1956-70)	0.235
5-6	5.44 ± 0.52	38.9 ± 9.0	1955 (1948-66)	0.189
6-7	4.00 ± 0.47	22.6 ± 8.3	1951 (1942-63)	0.272
7-8	3.43 ± 0.38	23.2 ± 7.2	1945 (1935-60)	0.226
8-9	3.88 ± 0.51	34.3 ± 8.5	1935 (1922-58)	0.120
9-10	2.61 ± 0.44	11.1 ± 13.	-	-
10-11	1.96 ± 0.43	19.7 ± 8.2	-	-
11-12	1.76 ± 0.45	2.8 ± 12.	-	-
12-13	1.17 ± 0.47	19.3 ± 9.1	-	-
13-14	1.17 ± 0.45	10.4 ± 8.4	-	-
14-15	1.07 ± 0.49	10.2 ± 16.	-	-
15-16	1.10 ± 0.32	4.0 ± 12.	-	-
16-17	1.15 ± 0.41	-3.0 ± 7.2	-	-

The plutonium activities found in the 10 g of analyzed sediment from core St-3 are:

²³⁹⁺²⁴⁰Pu : 0.1960 ± 0.0065 Bq

²³⁸Pu : 0.00353 ± 0.00040 Bq

In the St-3 core the hot particle was found at 4-5 centimetre depth, corresponding to 1973 (range between 1965-90). The high uncertainty interval is due to the low resolution of the ²¹⁰Pb profile and allows to assign its transfer pathway to both aerial and fluvial routes. The ¹³⁷Cs dating method was applied to try to elucidate its actual transport route. The maximum radiocaesium concentration in the profile appears in the 6-7 cm

section; which should be assigned to 1963, the year of maximum fallout concentration. In this way, an average sedimentation rate of 0.40 g/cm²y was estimated. As the hot particle appears in the 4-5 cm section, its age corresponds to 1969. It is still doubtful to distinguish between the two proposed routes, although the radiocaesium chronology points more likely towards an aerial transfer at the time of the accident and subsequent transport by descending currents.

TABLE 3
Dating results of core St-3. Coordinates 37°08.1 N 01°48.5 W;
depth 64 m.

SECTION (cm)	¹³⁷ Cs Bq/kg ± 1σ	²¹⁰ Pb _{ex}	DATE	Sed.rate g/cm ² y
0-1	-	-	1983 (1984-89)	0.408
1-2	5.37 ± 0.47	37.2 ± 8.9	1980 (1979-90)	0.423
2-3	-	-	1978 (1974-90)	0.453
3-4	4.63 ± 0.53	26.5 ± 9.4	1975 (1970-90)	0.505
4-5	-	-	1973 (1965-90)	0.475
5-6	5.77 ± 0.50	25.0 ± 9.2	1970 (1960-91)	0.453
6-7	7.22 ± 0.52	35.0 ± 9.3	1965 (1952-92)	0.289
7-8	6.29 ± 0.58	29.4 ± 10.	1961 (1944-92)	0.299
8-9	-	-	1956 (1937-93)	0.274
9-10	4.51 ± 0.50	26.8 ± 9.2	-	-
10-11	-	-	-	-
11-12	2.52 ± 0.53	27.2 ± 9.4	-	-
12-13	-	-	-	-
13-14	< 0.6	13.9 ± 8.9	-	-
14-15	-	-	-	-
15-16	1.00 ± 0.40	9.8 ± 8.5	-	-
16-17	< 0.6	8.0 ± 9.4	-	-

TABLE 4
Isotopic ratios of the hot particles. ²⁴¹Pu activity referred to
1/1/89.

	St-1	St-2	St-3
²³⁸ Pu/ ²³⁹⁺²⁴⁰ Pu	0.0199 ± 0.0030	0.0280 ± 0.0037	0.0180 ± 0.0021
²⁴¹ Pu/ ²³⁹⁺²⁴⁰ Pu	1.42 ± 0.46	-	-
²⁴¹ Am/ ²³⁹⁺²⁴⁰ Pu	0.447 ± 0.042	-	-

It should be remarked that gamma spectrometry was performed on different sediment subsamples to those used to radiochemical analysis. In cores St-2 and St-3 the presence of a hot particle was detected by processing the sample radiochemically; in the case of St-1 it was detected during gamma spectrometry, so that a deeper study has been possible.

It seems obvious that the inhomogeneity present in the samples is not typical of the current fallout situation in Mediterranean sediments. It appears evident that the origin of the inhomogeneity found in the studied samples originates from the Palomares accident.

CONCLUSIONS

The use of both natural and artificial radionuclides to estimate the chronology of recent sediments is a valuable tool when evaluating transfer processes in the marine environment.

Isotopic ratios of radionuclides constitute a tool for identifying the different sources of radionuclides (plutonium in this case) found in the samples.

Their application to the marine environment in the Palomares area has shown the different pathways by which the aerosol and residual contamination in soil could reach the Mediterranean marine environment.

REFERENCES

1. Gascó C. Romero L. & Iranzo E.: J. Radioanal. Nucl. Chem. in press
2. Lobo A.M. Romero L. & Palomares J.: An. Fis. (Spain) in press.
3. Cutshall N.H. Larsen I.L. & Olsen C.R.: Nucl. Instrum. Meth., 1983, 206, 309.
4. Holm E. Fukai R. & Ballestra S.: Talanta, 1979, 26, 791.

5. Mitchell P.I.: personal communication (1990).
6. Appleby P.G. & Oldfield F.: Catena, 1978, 5, 1.
7. Aarkrog A. Dahlgard H. Nilsson K. & Holm E. Health Phys. 1984, 46, 29.
8. Romero L. Lobo A.M. & Holm E.: Proc. ANS International Topical Conference MARC-II, Kona 1991.
9. Jennings C.D.: personal communication (1988).



United States Department of State

Washington, D.C. 20520

August 16, 1991

*off
Rick/Tom B*

Mr. Harry J. Pettengill
Deputy Assistant Secretary
for Health
Department of Energy
Washington, D.C. 20585

Dear Mr. Pettengill:

Thank you for your informative July 8 letter which provided background and an update on the Hall-Otero Agreement between the United States and Spain. Tom Bell has been in touch with me on several occasions to review the issue and discuss next steps.

Our Embassy in Madrid has been involved in the implementation of Project Indalo and can assist in contacts with Spanish Government officials. I have suggested to Tom that he be in touch with Robert Morris, Counselor for Science and Technology at the Embassy, to coordinate the approach to the Spaniards. I would appreciate being kept informed of developments as warranted.

As you are aware, the nuclear issue, particularly involving weapons, remains a neuralgic one in Spain. While we must remain sensitive to this context, careful planning and coordination should ensure the continued successful implementation of Project Indalo.

Please let me know if I can assist your efforts in any way.

Sincerely,

Thomas Frank Foulger
Officer-in Charge for Spain



Department of Energy

Washington, DC 20585

Mr. Emilio Iranzo
Spanish Government
Junta de Energia Nuclear
Division of Radiation
Protection and Environment
Madrid, Spain

APR - 5 1989

Dear Mr. Iranzo:

Subject: Modification Number A009

Contract Number DE-GI01-82EP12126

Enclosed herewith is one fully executed copy of the subject modification.

Please acknowledge receipt of this modification by completing the "Acknowledgment" below and returning it to:

U.S. Department of Energy
Office of Procurement Operations
ATTN: Ms. Paola E. Pizzano, MA-453.1
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Sincerely,

Jack B. Peel
Contracting Officer
Office of Procurement Operations

Enclosure

ACKNOWLEDGMENT:

Contractor's Authorized
Representative Signature

Date April 18, 1989

Name and Title (Typed/Printed)

Dr. Emilio Iranzo
Head of the Project

ISSUED BY	See Block 16c MA-453.1	01-39EP12126.001	89CS527
CODE		ADMINISTERED BY (If other than Item 6)	CODE
U.S. Department of Energy Office of Procurement Operations 1000 Independence Avenue, SW Washington, D.C. 20585		Same as Block 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., street, country, State and ZIP Code) Spanish Government Junta de Energia Nuclear Division of Radiation Protection and Environment Madrid, Spain ATTN: Otero-Hall Agreement	<input checked="" type="checkbox"/>	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
	<input checked="" type="checkbox"/>	10A. MODIFICATION OF CONTRACT/ORDER NO. DE-G101-82EP12126
		10B. DATED (SEE ITEM 11) February 26, 1966
CODE	FACILITY CODE	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15 and returning _____ copies of the amendment. (b) By acknowledging receipt of this amendment on each copy of offer submitted, or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegraphic letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

09X0224.91 HAO110 GR-91-91 0250 EN/YA Obligate: \$200,000 CFA 01899650 B/NC B142

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying off appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER (Specify type of modification and authority):
X By Mutual Agreement of the Parties

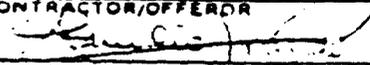
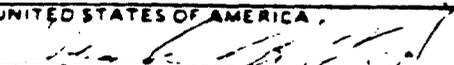
IMPORTANT: Contractor is not, is required to sign this document and return 4 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF action headings, including solicitation/contract subject matter where feasible.)

The purposes of this modification are to: (1) incrementally fund this cost period; and (2) extend the period of performance of this agreement. Accordingly, the U.S. and Spanish cooperative Biomedical Research Program, (Project Indalo), is modified as follows:

SEE PAGE TWO

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print) Dr. Emilio Iranzo Head of the Project		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Jack B. Peel Contracting Officer	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED April 18, 1989	16B. UNITED STATES OF AMERICA BY  (Signature of Contracting Officer)	16C. DATE SIGNED APR - 5 1989

1. This modification (A009) obligates \$200,000 for the cost period starting February 1, 1989 through January 31, 1990.
2. The period of performance for this agreement is hereby extended through May 1, 1990.
3. Based on the Otero-Hall Agreement and the current year proposal, the Controller is authorized to make payment to the Government of Spain. Payment is to be made through the American Embassy in Madrid, Spain, to:

Spanish Government
Junta de Energia Nuclear
Division of Radiation Protection and Environment
Madrid, Spain
ATTN: Hall-Otero Agreement
(Project Indalo)



MINISTERIO DE INDUSTRIA Y ENERGIA
CENTRO DE INVESTIGACIONES ENERGETICAS
MEDIOAMBIENTALES Y TECNOLOGICAS
(C.I.E.M.A.T.)

Avda. Complutense, 22. 28040-MADRID

Madrid, April 18, 1989

Ms. PAOLA E. PIZZANO, MA-453.1
Office of Procurement Operations
U.S. Department of Energy
WASHINGTON D.C.

Dear Ms. Pizzano:

I am returning to you the "Acknowledgment" of the Modification Number ACC9 for the Contract number DE-GI01-82FP12126 as has been asked to me by Mr. Jack B. Peel, Contracting Officer from the Office of Procurements Operations.

I have signed the modification but I do not understand what means the item:

2. The period of performance for this agreement is hereby extended through May 1, 1990.

No problem if it means that every year must be said some thing about the extended period. If it means that agreement will finish in May 1990 we do not agree.

I will appreciate your explanation about it.

Please, take note that the name of our Organization is now: CENTRO DE INVESTIGACIONES ENERGETICAS MEDIOAMBIENTALES Y TECNOLOGICAS (C.I.E.M.A.T.) instead of JUNTA DE ENERGIA NUCLEAR.

So, please, change the the name of the CONTRACTOR by:
Spanish Government
C.I.E.M.A.T.
Institute of Radiation Protection and Environment
Madrid, Spain
ATTN: Otero-Hall Agreement

The payment through the America Embassy must be made also to the actual name of the CONTRACTOR.

Sincerely yours,


Emilio Iranzo
Head of Indalo Project



Department of Energy
Washington, DC 20585

MAY - 1 1990

Dr. Emilio Iranzo
Spanish Government
C.I.E.M.A.T.
Institute of Radiation
Protection and Environment
ATTN: Otero-Hall Agreement
Madrid, SPAIN

Dr. Iranzo:

Enclosed are six copies of Modification M010 to International Agreement
Number DE-GI01-82EP12126.

Please have an authorized official of your organization sign and complete
Block 9 on the Face Page of six (6) copies of the subject agreement. Retain
one of your signed copies for future reference. The five remaining copies
should be returned immediately to:

U.S. Department of Energy
Office of Procurement Operations
ATTN: Ms. Lisa Tillman, PR-541
Room LJ-027
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Upon receipt thereof and execution by an authorized Department of Energy
Contracting Officer, one fully executed copy will be returned to you. If
your agency requires additional executed copies of this agreement, return
additional signed copies to the Department of Energy for final execution.

Sincerely,

Lynn Warner
Contracting Officer
Office of Procurement Operations

Enclosure

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1 CONTRACT ID CODE

1 1 1

2 AMENDMENT/MODIFICATION NO M010	3 EFFECTIVE DATE See Block 16c	4 REQUEST/PURCHASE REQ NO 01-90EP12126.001	5 PROJECT NO (If applicable) 89ES527
6 ISSUED BY U.S. Department of Energy / Procurement Operations 1000 Independence Avenue, S.W. Washington, D.C. 20585	CODE PR-541	7 ADMINISTERED BY (If other than item 6) Same as Block 6	CODE

8 NAME AND ADDRESS OF CONTRACTOR (Ab, street, city, county, State and ZIP Code) Spanish Government C.I.E.M.A.T. Institute of Radiation Protection and Environment Madrid, Spain ATTN: Otero-Hall Agreement	9A AMENDMENT OF SOLICITATION NO
	9B DATED (SEE ITEM 11)
	10A MODIFICATION OF CONTRACT/ORDER NO DE-GI01-82EP12126
	10B DATED (SEE ITEM 13) February 26, 1966

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers is entered is not entered.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing item 8 and 15, and returning ___ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12 ACCOUNTING AND APPROPRIATION DATA (If required)
B/NC 118

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

<input type="checkbox"/>	A THIS CHANGE ORDER IS ISSUED PURSUANT TO (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO IN ITEM 10A
<input type="checkbox"/>	B THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b)
<input type="checkbox"/>	C THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF
<input checked="" type="checkbox"/>	D OTHER (Specify type of modification and authority) By Mutual Agreement of the Parties

E IMPORTANT Contractor is not, required to sign this document and return 5 copies to the issuing office

14 DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible)

The purpose of this modification is to extend the period of performance of this agreement and make other administrative changes. Accordingly, the U.S. and Spanish Cooperative Biomedical Research Program, (Project Indalo), is modified as follows:

1. The period of performance for this agreement is hereby extended through September 30, 1991.
2. The contract specialist for the agreement is Lisa Tillman, telephone number (202) 586-1568.

Except as provided herein, all terms and conditions of the document referenced in item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A NAME AND TITLE OF SIGNER (Type or print)	15A NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Lynn Warner, Contracting Officer
15B NAME OF CONTRACTOR BY _____ (Signature of person authorized to sign)	15C DATE SIGNED
15B UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	15C DATE SIGNED



MINISTERIO DE INDUSTRIA Y ENERGIA
CENTRO DE INVESTIGACIONES ENERGETICAS
MEDIOAMBIENTALES Y TECNOLOGICAS
(C. I. E. M. A. T.)

C	Instituto PRYMA
	U. G. ECONOMICA E IMPACTO
	U. G. A. 11.105
	39
	4-7-90

Madrid, 3 de Julio de 1990

U.S. Department of Energy
Office of Procurement Operations

Attn: Ms. LISA TILLMAN, PR-541
Room 1J-027
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Ms. Tillman:

I am returning to you the five copies of the Modification MO10 to International Agreement Number DE-GI01-82EP12126.

The Director General of CIEMAT have signed it.

However the Block 9 has not been completed because we do not understand to which Amendment of Solicitation Number is referred. Never this block has been filled by us. Can you better explain what do you want from us?.

In relation with the Block 14 we would like to introduce a new point 3 to state the actual head of the project in Spain wich is Mr. José Gutiérrez. That is due to the retirement of Dr. E. Iranzo because legal age requirement.

In this amendment nothing is mentioned in relation with the funds for the period, so we understand this is at least 200.000\$ per each fiscal year period.

By other way and in relation with the yearly payments we consider that you are in debt with us. We have not received the obligated funds for the lasts two fiscal years.

Please sent to us at least one signed original form of this Amendment.

*NEVER
RECEIVED*

Sincerely yours,

J. Gutiérrez
HEAD OF INDALO PROJECT

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE

PAGE OF PAGES

1 | 1

AMENDMENT/MODIFICATION NO. M010	3. EFFECTIVE DATE See Block 16c	4. REQUISITION/PURCHASE REQ. NO. 01-90EP12126.001	5. PROJECT NO. (If applicable) 89ES527
ISSUED BY J.S. Department of Energy / Procurement Operations 1000 Independence Avenue, S.W. Washington, D.C. 20585	CODE PR-541	7. ADMINISTERED BY (If other than Item 6) Same as Block 6	CODE

NAME AND ADDRESS OF CONTRACTOR (Ab. street city, county, State and ZIP Code) Spanish Government C.I.E.M.A.T. Institute of Radiation Protection and Environment Madrid, Spain ATTN: Otero-Hall Agreement	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
	10A. MODIFICATION OF CONTRACT/ORDER NO. DE-GI01-82EP12126
	10B. DATED (SEE ITEM 13) February 26, 1966
CODE	FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

- a) By completing Item 8 and 15, and returning _____ copies of the amendment;
 - b) By acknowledging receipt of this amendment on each copy of the offer submitted; or
 - c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers.
- FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

B/NC 118

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
D. OTHER (Specify type of modification and authority) <input checked="" type="checkbox"/> By Mutual Agreement of the Parties

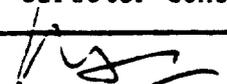
IMPORTANT Contractor is not required to sign this document and return 5 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

The purpose of this modification is to extend the period of performance of this agreement and make other administrative changes. Accordingly, the U.S. and Spanish Cooperative Biomedical Research Program, (Project Indalo), is modified as follows:

1. The period of performance for this agreement is hereby extended through September 30, 1991.
2. The contract specialist for the agreement is Lisa Tillman, telephone number (202) 586-1568.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print) J. Angel Azuara, Director General	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Lynn Warner, Contracting Officer
15B. NAME OF CONTRACTOR BY  (Signature of person authorized to sign)	15C. DATE SIGNED 27-06-90
15D. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED



MINISTERIO DE INDUSTRIA Y ENERGIA
CENTRO DE INVESTIGACIONES ENERGETICAS
MEDIOAMBIENTALES Y TECNOLOGICAS
(C. I. E. M. A. T.)

INSTITUTO PRYMA. Geoquímica e Impacto Ambiental
Avda. Complutense, 22. 28040-MADRID (Spain)

INSTITUTO PRYMA
41
13-julio 1990

Madrid, July 6, 1990

CHE
DR. CRHSTER R. RICHMOND
Director
Science Education Programs
and External Relations
Post Office Box 2008
Oak Ridge, Tennessee 37831-6253
U.S.A.

Dear Dr. Richmond:

We have received, as each year, the Amendment of Modification M010 to International Agreement Number DE-GI01-82EP12126. A photocopy of it is sent to you as well as our answer.

From this Amendment it looks that DOE do not consider necessary to make a new agreement to substitute the "Otero-Hall Agreement". Then we think that the relations between you and us and between DOE and CIEMAT must be will continue as in the past.

As you know we still have problems in relation with the obligated yearly funds wich has not been sent for the two last fiscal years.

So, please send us yours suggestions about the convenience of renewings the yearly reporting for continuing assistance and any other exchange of technical or administrative information.

I inform you that Dr. Iranzo is working with us as scientific advisor.

Sincerely yours,

J. Gutiérrez
HEAD OF INDALO PROJECT

OAK RIDGE NATIONAL LABORATORY - TEN

OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE U. S. DEPARTMENT OF ENERGY

CHESTER R. RICHMOND

DIRECTOR

SCIENCE EDUCATION PROGRAMS AND EXTERNAL RELATIONS

FAX - 615 5762912

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831-6250
(615) 576-2008 FAX 576-2912

August 7, 1990

Dr. J. Gutierrez
Ministerio De Industria y Energia
Centro De Investigaciones Energeticas
Medioambientales y Tecnologicas
Avda. Complutense, 22
Madrid, Spain

Dear Mr. Gutierrez:

Thank you for your letter of 6 July which I received on 23 July. I have forwarded your letter to me to the Department of Energy for their information.

As you may recall, the responsibility for Program Indalo was to have been changed to the Defense Programs (DP) within the U. S. Department of Energy from the Assistant Secretary for Environment, Health and Safety (ESH). This change was to take place in October of 1990. Recently, the decision to change the program responsibility for Project Indalo was again changed and DOE/ESH will remain as the responsible program agent. I recently met with the ESH staff responsible for the program and expressed my concerns about the interruption of funding for Project Indalo. The DOE recently established a Deputy Assistant Secretary for Health who reports to the Assistant Secretary for Environment, Safety and Health (ESH). As I understand the situation, the responsibility for Project Indalo will reside in that new organization.

I provided background information about the program and the funding problems to the new program managers at a meeting in Washington on 26 July (just several days after I received your letter). The DOE staff were very attentive and wanted to learn more about the project. I expect that some of them will either visit Spain or have you and your colleagues visit them in Washington in the future. I have stressed to them the importance of establishing a dialog with the CIEMAT on Project Indalo.

I will keep you informed as to any progress and I look forward to working with you. Incidentally, we are completing our excretion model for ^{241}Am . I will send that material to you in the near future. Dr. Iranzo had requested that study some time ago. Please give my best to Dr. Iranzo and my many friends at the CIEMAT. Could you also send me your phone number and other means of communicating with you. Also, please send me the exact mailing address that you prefer.

Sincerely,



Chester R. Richmond

C O P Y

Madrid, Spain,
February 25, 1966.

Dear Professor Otero:

Pursuant to our Agreement for Cooperation for Civil Uses of Atomic Energy between Spain and the United States I wish to propose that we expand our collaboration in the fields of health and safety. Accordingly, on behalf of the United States Atomic Energy Commission and in accordance with the relevant articles in our Agreement for Cooperation of August 16, 1957, as amended, I suggest we investigate various health and safety aspects of fissionable materials when released into a rural agricultural environment.

Collaborative investigations shall be initiated as soon as possible of the physiological and ecological behavior of plutonium oxide in a previously contaminated rural area that has been decontaminated in accordance with mutually agreed upon decontamination limits and procedures. More specifically the investigations shall consist of the points I have set forth in the attached annex to this letter.

It is understood that information considered essential to our collaboration shall be shared freely by the two agencies as well as all information derived from these investigations. It is further understood that the results derived shall not be released to the public without the concurrence of the two agencies.

If these

Excmo. Sr. D. Jose' María Otero Navascues,
Marques de Hermosilla,
Presidente de la Junta de
Energía Nuclear,
Avenida Complutense 22,
Ciudad Universitaria.

C O P Y

-2-

If these proposals are acceptable to you, I suggest that this letter and your letter of acceptance shall constitute an understanding on these subjects between our two agencies.

Sincerely,

John A. Hall
Assistant General Manager for
International Activities
ATOMIC ENERGY COMMISSION

Enclosure: Annex

A N N E X

1. Collection of information on uptake and retention of plutonium and uranium by representative numbers of a population group potentially exposed to inhalation of a plutonium oxide aerosol,
2. measurement of temporal and seasonal fluctuations in plutonium air concentrations above a plutonium oxide contamination agricultural area that has been subjected to the agreed upon decontamination procedures,
3. serial measurements of contamination levels (both by plant uptake from the soil and wind dispersal) of agricultural products produced in a contaminated area subsequent to decontamination and,
4. studies of the temporal migration and redistribution of plutonium oxide in soil, decontaminated by deep plowing, as a result of continued cultivation and weathering.

Page 2 of

Annex .

The Junta will assume the position of principal investigator with the U.S.A.E.C. providing support in the form of technical assistance and advice and specialized equipment and materials not readily available to the Junta.

In the role of principal investigator the Junta will assume responsibility for the following:

1. Provision of building and laboratory space required to initiate and carry on the program.
2. Establishment, with the help of U.S. specialists, of sampling methods, routines and schedules for population, air, produce and soil measurements.
3. Provision of logistic support required by sampling and measuring schedules.
4. Performance of all scientific measurements and tests.
5. Compilation and documentation of all scientific data.
6. Provision of travel for its own specialists sent to the United States for consultation, planning or training purposes.

Page 3 of

Annex

In the role of secondary investigator, the U.S.A.E.C. will assume responsibility for the following:

1. Provision, either through funding or by transfer, of specialized equipment and material required by the program. During the first year this will consist of:
 - a. A whole body counter, complete with crystal spectrometer and plutonium X-ray detector.
 - b. One (8 place) scintillation alpha counter of the type currently in use at the Los Alamos Scientific Laboratory or the New York Health and Safety Laboratory.
 - c. One alpha spectrometer complete with multi-channel analyzer and data read-out equipment.
 - d. Additional, less specialized equipment, such as analytical balances, centrifuges, special chemicals, etc., in the amount of approximately \$15,000.
 - e. Plutonium and uranium analytical standards.

Page 4 of

Annex

- f. Four generator-powered Hi-Vol air samplers of the latest design for continuous field operation.
2. Provision of a visiting specialist to install and calibrate the whole body counter and to train Junta personnel in its use.
3. Provision of visiting specialists in methods of plutonium and uranium analysis, to install specialized analytical equipment and train Junta personnel in techniques of plutonium and uranium measurement which are used in the United States, published and unpublished.
4. Provision of a visiting specialist in soil and plant sciences to help develop the studies of plutonium translocation in the soil and its uptake by cultivated crops.
5. Continued provision, beyond the first year, of specialized equipment, technical assistance and advice for as long as both parties mutually agree to be desirable on the basis of the observations as they are obtained.

Palomares, 25 años después

La población almeriense donde en 1966 cayó un avión con cuatro bombas nucleares prefiere olvidar aquel accidente

CHARO NOGUEIRA

Será un cumpleaños sin fiesta y con olvido. El próximo jueves 17 de enero hará 25 años del accidente de dos aviones americanos sobre el cielo almeriense de Palomares. Cuatro bombas atómicas, dos de ellas abiertas, cayeron sobre el área. Un cuarto de siglo después del baño del ministro Fraga Iribarne, los vecinos viven sin miedo, pero con incertidumbre. Cáncer es palabra temida.

"Si alguien puede demostrarnos que padecemos secuelas negativas por la radiación, que lo haga. Como nadie lo ha conseguido, solo queremos que nos dejen tranquilos". José Avila, alcalde pedáneo de Palomares, es un joven contundente. "No vamos a conmemorar nada. Lo que nos preocupa estos días es el Golfo", zanja el edil socialista. Del Persico hablan con tono experto los abuelos en el bar Tomás. "Los americanos, ya se sabe, siempre quieren la tajada", argumenta un lugareño que prefiere caillar su recuerdo.

Palomares es un pueblo laborioso en el que ganó el sí a la OTAN en el referéndum. El cultivo del tomate ha traído prosperidad a sus mil habitantes, que quieren olvidar. "No se puede vivir siempre pensando en aquello", explica la ex alcaldesa Antonia Flores, que de niña se sentó sobre una de las bombas abiertas, caída junto a su casa.

Aquello ocurrió la soleada mañana del 17 de enero de 1966. A las 10.22 de la mañana, cuando soplaban un fuerte poniente, un superbombardero B-52 y el avión nodriza KC-135 que le abastecía se chocaron en el aire. Otras dos aeronaves salieron indemnes. Sobre el área de Palomares cayeron cuatro bombas termonucleares, de 25 megatones cada una. La hallada en el lecho seco del río Almanzora y la que localizó Paco el de la Bomba en el mar estaban intactas. Las otras dos se abrieron y liberaron uranio 235 y plutonio 239.

"Parecía el fin del mundo", recuerda Martín Ponce. "Uno de los pilotos decía: 'Catastrofe, catastrofe'". De los once tripulantes, siete fallecieron y cuatro resultaron heridos. Martín se afana sobre las matas plantadas junto al cementerio, allí donde cayó el otro artefacto que liberó plutonio. "Si la tierra estuviera mala, mis tomates no sabrían tan ricos", señala.

La población no fue evacuada. Las tropas de EE.UU. con amplio despliegue de barcos y helicópteros, llegaron rápidamente. Era la operación *Flecha Rota*. Las autoridades españolas dejaron hacer. Las tareas de descontaminación incluyeron la destrucción de plantaciones y el traslado de cientos de toneladas de tierra a EE.UU. Las indemnizaciones fueron en general escasas, coinciden hoy los vecinos.

"Las mujeres se escondían de los soldados negros. Nunca se había visto ninguno aquí", recuerda Manuel González. "Los expertos que vinieron nos decían continuamente que nos lavaríamos con *omo*", añade Antonio Flores. Los dos recuerdan la visita de la Duquesa de Medina Sidonia. "Aquello fue una vergüenza. Los americanos llevaban



El entonces ministro de Información y Turismo, Manuel Fraga (en el centro), y el embajador norteamericano, Anthony Biddle Duke (a su izquierda), durante su histórico baño en Palomares, en marzo de 1966. A la derecha, un agricultor, Martín Ponce, cultiva tomates al lado del detector de radioactividad del pueblo almeriense.



EUROPA PRESS. CRISTÓBAL

trajes especiales para recoger el plutonio y los españoles, buena" recuerda la anéstora, que pasó ocho meses de cárcel por promover una manifestación.

El campamento se mantuvo hasta que, el 7 de abril, los americanos sacaron del mar la cuarta bomba. "Durante 81 días fui con ellos adonde la había visto caer.

Me ponía encima, pero sus aparatos no la detectaban", recuerda el todavía pescador Francisco Simó.

Un mes antes, el 8 de marzo, el ministro de Información y Turismo, Manuel Fraga Iribarne, y el embajador de EE.UU., Angier Biddle Duke, protagonizaron un histórico baño. Los paloma-

reños aseguran que no fue en su playa, sino en la de Mojácar. "Solo un perfecto imbecil puede decir eso. Buscando el efecto desdramatizador que yo buscaba, no iba a correr riesgos" se defiende el actual presidente de la Xunta de Galicia.

Junto a las tomateras de Martín esta uno de los tres detectores

de radiactividad instalados en el pueblo por la antigua Junta de Energía Nuclear, hoy Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT). Este organismo está encargado del seguimiento de la contaminación nuclear. Grupos de palomareños siguen viajando a Madrid para los reconocimientos. La ex alcaldesa se queja de la poca información que reciben.

Sin embargo, tanto el Ciemat como el Consejo de Seguridad Nuclear (CSN) niegan las acusaciones. En el informe exhaustivo del CSN, —diciembre de 1985—, se afirma: "La contaminación residual existente en la zona de Palomares no representa un riesgo indebido para las actividades normales de la zona".

Los informes oficiales admiten carencias en el seguimiento. No se han hecho estudios epidemiológicos, reconoce el director de Protección Radiológica y Medioambiente del Ciemat, Francisco Mingot. "Se puede ampliar la vigilancia, pero lo fundamental está cubierto", tranquiliza. En Palomares hay quien cree que el cáncer es demasiado frecuente. Sin embargo, los escasos estudios realizados demuestran la tendencia contraria. El médico Pedro Martínez Pinilla ha analizado la mortalidad entre 1966 y 1986. "El índice de tumores está por debajo de la media nacional, pero hay que seguir estudiando el caso. Falta un gato", señala.

Mientras, la vida sigue. Josefina López, 71 años y un hijo muerto de leucemia, planta patatas. "Hay que enterrar los recuerdos. Si no, se funde una". Inclina, sigue sembrando.

Un baño para la historia

CARLOS MENDO
"Sabes nadar?". Ante la respuesta afirmativa del periodista, a la sazón director gerente de la agencia Efe, el interior, Manuel Fraga Iribarne, a la sazón responsable del turismo español como ministro del ramo, ordena: "Te espero mañana a las ocho en la base de Getafe. Nos vamos a bañar en Palomares". La fecha, marzo de 1966, dos meses después de que un avión norteamericano perdiese una bomba nuclear en las placidas aguas del Mediterráneo.

España se empezaba a despreparar entonces de cerca de dos décadas de política autárquica y se disponía a iniciar un desarrollo económico para el que precisaba del oxígeno vital del turismo. El accidente de la bomba con la posible contaminación de las playas mediterráneas había provocado cancelaciones en masa en los hoteles de la costa desde Gibraltar a Almería.

Fraga decidió que la mejor forma de probar a los turistas la

ausencia de contaminación era zambullirse. Pero un baño a cargo de un miembro del Gobierno español y de algunos de sus colaboradores quizás no fuera lo suficientemente convincente. Después de todo, siempre ha habido kamikazes dispuestos a sacrificarse por el buen nombre del país. Era necesario comprometer a alguien de altura. Y, ¿qué mejor candidato que el embajador de la potencia responsable de la bomba, en aquellos momentos el Honorable Anthony Biddle Duke?

El diplomático aceptó con una alegría forzada. A la mañana siguiente, un helicóptero del Ejército del Aire Español depositaba en la playa de Mojácar a Fraga y al resto de los expedicionarios, entre los que se encontraban Carlos Sentis, presidente de la agencia EFE y el que suscribe.

Biddle Duke se acercó a cumplimentar al ministro: "¡Ya me he bañado, ministro! ¡dijo gozoso. Fraga le cortó en seco: "¡Usted se ha bañado aquí. Pero el pacto era que nos

bañaríamos juntos en aguas de Palomares!". Y hacia Palomares nos encaminamos.

En una tienda de campaña montada por el Ejército en la playa, nos despojamos de nuestra vestimenta de invierno y nos embutimos los trajes de baño. Fraga se puso un *mevba* horroroso, que se hinchó como un globo al introducirse en las aguas gélidas del Mediterráneo. Tras él, el embajador y los acompañantes seguimos disciplinados.

Unas brazadas bastaron para que las televisiones de todo el mundo captaran la imagen. Cuando creímos que el tormento del hielo había terminado, apareció en la playa un caballero en bañador con el pelo cortado a cepillo y aire militar, que se dirigió resueltamente hacia el agua. Era el jefe de la zona aérea de, estrecho. "No vamos a permitir que el general se bañe solo", comentó el actual presidente de la Xunta de Galicia. Y, como automatismo, nos volvimos a sumergir en las inhospitas aguas