

THE DEPARTMENT OF ENERGY (DOE)/CENTRO DE INVESTIGACIONES
ENERGETICAS MEDIOAMBIENTALES Y TECNOLOGICAS (C.I.E.M.A.T.)
DOSE ASSESSMENT MEETING

On November 2-4, 1992, a meeting was held in Rockville, Maryland, between representatives of DOE and representatives of the Spanish Government organization responsible for the Palomares Surveillance Program, C.I.E.M.A.T. The purpose of the meeting was to discuss and exchange information relevant to the Palomares Surveillance Program and the Marshall Islands Surveillance Program.

Attendees

Name	Organization
Paul L. Ziemer	DOE/EH-1
C. Rick Jones	DOE/EH-41
R. Thomas Bell	DOE/EH-411
Bill Robison	Lawrence Livermore National Laboratory (LLNL)
Anant Moorthy	Brookhaven National Laboratory (BNL)
Edward Kaplin	BNL
Kathryn A. Higley	Colorado State University (CSU)
Scott B. Webb	CSU
Peter O'Connell	DOE/EH-411
George Gebus	DOE/EH-43
Alan E. Knight	DOE/CP-20
Sherwood McGinnus	Department of State
Chester R. Richmond	Oak Ridge National Laboratory
Emilio J. Iranzo	C.I.E.M.A.T.
Santiago Castano	C.I.E.M.A.T.
Jose Gutierrez	C.I.E.M.A.T.
Emma Iranzo	C.I.E.M.A.T.
Asuncion Espinose	C.I.E.M.A.T.
Merril Eisenbud	DOE Consultant

Summary

The DOE and C.I.E.M.A.T. representatives presented detailed briefings and exchanged protocols and relevant information on the following aspects of the Marshall Islands and the Palomares Surveillance Programs: Environmental Characterization, Whole Body Counting, Bioassay, Internal Dosimetry, and Medical Surveillance.

Conclusions

The meeting resulted in an excellent exchange of information relevant to the current programs. The meeting also identified several areas where the current programs could be enhanced. In addition, other areas were identified which, if pursued, would improve both programs and could provide additional scientific data which would be of value to both programs.

Environmental Characterization

Valuable information could be obtained by characterizing the particle size distribution and plutonium (Pu) transportation on the island of Runit (Yvonne). The radioactive source term on this island originates from a safety test, as opposed to a nuclear detonation. This source term is similar in nature to the Palomares source term and the information would be useful for comparison with Palomares data.

Additional information could be obtained on the resuspension of radioactive material at Palomares through C.I.E.M.A.T.'s use of LLNL equipment, including personnel air monitors and high volume samplers.

A program enhancement for both programs was recognized through the establishment of a split sample analysis protocol between C.I.E.M.A.T. and LLNL. The split sample analysis program should include samples of soil, vegetation, and air sample filters.

Whole Body Counting, Bioassay, and Internal Dosimetry

As part of the urine bioassay protocol, C.I.E.M.A.T. tests samples and uses acceptance criteria for creatinine. The test is used to demonstrate that a subject's kidney function has not deviated since the last urine bioassay. The BNL does not perform this test as part of their urine bioassay protocol. The applicability of this test for BNL's protocol should be reviewed.

The C.I.E.M.A.T. may be able to achieve better sensitivity through the use of BNL's fission track analysis for Pu in urine samples.

The dose methodology used by BNL should be reviewed. The review should include assumptions made concerning chronic versus acute exposure and inhalation versus ingestion pathway analysis. The BNL should conduct an evaluation regarding the dose contribution from americium (Am).

Additional information concerning the variability of daily excretion rates for individuals with Pu body burdens may be available through BNL's bioassay program.

Medical Surveillance

The Marshall Islands Medical Surveillance Program was found to be similar to the Palomares Medical Surveillance Program.

Agreements Reached

Administrative Agreements

1. The C.I.E.M.A.T. is to submit to DOE budget expenditure summary reports by fiscal year beginning with the period October 1, 1992, to September 31, 1993.

2. Each April C.I.E.M.A.T. is to submit to DOE budget projection requests for the upcoming fiscal year as well as the next two fiscal years. The April 1993 submittal should include budget projections for the periods; October 1993-September 1994, October 1994-September 1995, October 1995-September 1996.
3. The C.I.E.M.A.T. is to provide DOE with a copy of their annual report of the Palomares Program to the Spanish Safety Council. This report can be submitted to DOE in spanish and DOE will have the report translated into english.
4. The C.I.E.M.A.T. and DOE are to exchange copies of abstracts, papers, or reports that discuss the Palomares Program.
5. The DOE is invited to provide programmatic input to the Palomares Program.
6. The C.I.E.M.A.T. is invited to provide programmatic input to the Marshal Islands Program.

The BNL - C.I.E.M.A.T. Agreements

1. The C.I.E.M.A.T. will send relevant information to BNL regarding normalizing reported Pu activities on the basis of creatinine analysis. The BNL will evaluate the applicability to their program.
2. The C.I.E.M.A.T. and BNL will exchange methodologies and protocols for internal dose assessment. The groups will first focus on one or two sample calculations. Additional information will follow as necessary. The BNL is to evaluate the need for Marshall Islands internal dose estimates from americium.
3. The C.I.E.M.A.T. will send a split sample of five or six samples to BNL for fission track analysis of Pu. The C.I.E.M.A.T. expects to collect the next urine samples the first week of December 1992. Samples are to be selected on the basis of volume (at least 500 ml) and anticipated activity (less than 1 femtoCurie). The BNL will send C.I.E.M.A.T. protocols for sampling prior to December 1992.
4. The C.I.E.M.A.T. will collect successive 24 hour urine samples from two individuals. After a collection period of 4-5 days, the samples will be split and C.I.E.M.A.T. and BNL will analyze the samples for comparison.
5. The BNL will attempt to collect successive 24 hour urine samples from one or two individuals during the 1993 missions.
6. Analysis of the results of these samples will be made jointly by C.I.E.M.A.T. and BNL. Tentatively, the results will be discussed during a meeting at C.I.E.M.A.T. in September 1993.
7. The C.I.E.M.A.T. will send one staff member for training in the chemistry of fission track analysis to BNL for a 2-week period during the period April-June 1993.

8. During June-July 1993, C.I.E.M.A.T. will prepare several urine samples for irradiation at BNL using BNL supplied firepolished quartz substrates. Counting will be conducted at both C.I.E.M.A.T. and BNL. It is anticipated that a larger number of samples will be prepared for irradiation in the next several months. A site visit will be made at either C.I.E.M.A.T. or BNL at the end of 1993 to evaluate the results and make plans for continuing cooperation.
9. The BNL is to send C.I.E.M.A.T. a report of the results of completed fission track analysis.

LLNL - C.I.E.M.A.T. Agreements

1. Resuspension - Comparison between Palomares (aridic, silica-clay soils) and Runit Island (Calcareous, basic soils).

Palomares - LLNL Support of Palomares Project

- A. Activity particle size analysis of resuspended aerosols.
 - (1) Tilled soils.
 - (2) Undisturbed soils.
- B. Resuspension flux and rate - these data are essential for the Spanish effort to model the transport of Pu from the contaminated areas to the city and other surrounding areas.
 - (1) Tilled soils.
 - (2) Undisturbed soils.
- C. Supporting micrometeorology for the above tasks.
- D. Personal samples - the possibility of such studies is to be evaluated by C.I.E.M.A.T. There are psychological and political issues to be evaluated, although both groups agree the data would be extremely valuable.

Runit Island

- A. Activity particle size of resuspended aerosols.
- B. Better characterization of the soils - Pu composition along the lines of C.I.E.M.A.T.'s detailed studies of Palomares soils. The C.I.E.M.A.T. has an interest in helping us with this detailed characterization so the comparative data will be based on the same procedures. This will be very useful to us.

2. Quality Control (Q.C.)/Split Samples.
 - A. Soil - homogenized soils split into two fractions, one to Spain and one to U.S. Exchange of Palomares and Marshall Islands soils.
 - B. Vegetation - ash procedures for split samples to be determined for various types of vegetation.
 - C. Air filters - single or composite air filters with one-half of each filter going to each group.
 - D. Details of shipping samples between the United States and Spain will be worked out in the near future. The C.I.E.M.A.T. recommended using the Embassies.
3. Review of chemistry procedures, especially for Am.
4. Effect of fertilizers on Pu migration down the soil column. Both groups agreed to review the possibility of such experiments at their test sites. We agreed to a cursory evaluation, if possible, to see if there is an effect great enough to warrant further expenditure of effort and money.
5. Initial protocols and procedures are to be written by Mr. William Robison and exchanged with Ms. Emma Iranzo for review, alterations, and refinement. We also agreed to think about other areas where our cooperation in research would be of benefit to the Palomares project and Marshall Islands.
6. Preliminary schedule of visits and work. - A March/April 1993 visit by C.I.E.M.A.T. to LLNL to review chemistry procedures and establish details of the resuspension studies to be conducted in May/June 1993 at the Palomares site. We will visit C.I.E.M.A.T. during the May/June trip to review laboratory procedures and particle size characterization methods and provide appropriate soil samples from the Marshall Islands.

AREAS OF COOPERATION BETWEEN C.I.E.M.A.T. AND LLNL

General Schedule

1. Draft protocols and procedures exchanged by mid-December 1992.
2. Protocols for sample exchange and preparation for Q.C./Split samples to be defined by mid-January 1993.
3. Exchange of soil and vegetation samples could begin by late January or early February 1993. Current plans are for the exchange of five soil samples covering a range of 239 Pu and Am activities (excluding extremely high activities) and three types of vegetation. Preliminary plans are that C.I.E.M.A.T. will send LLNL ashed samples of tomato, watermelon, and pepper (sample selection at discretion of C.I.E.M.A.T.) and LLNL will send

C.I.E.M.A.T. ashed samples of bread, fruit, coconut meat, and papaya. Results should begin to be available within 2 months of the exchange. Budget figures for the additional work will be made available to DOE in January.

4. Visit by C.I.E.M.A.T. to LLNL in February/March 1993. Chemistry procedures will be reviewed. The details of the resuspension program will be finalized in detail at the time. Budget figures for the additional resuspension work will be made available to DOE in March.
5. The cooperative field resuspension studies will be conducted in May/June 1993. Analytical work, data evaluation, and joint reports between C.I.E.M.A.T. and LLNL will be done as rapidly as possible within the framework of regular program commitments by both groups.

Some of the air fillers collected during the resuspension studies will be split between C.I.E.M.A.T. and LLNL and will provide a third type of sample for the interlaboratory Q.C. effort

Future Plans

1. Additional funding will be required by C.I.E.M.A.T., LLNL, and BNL to support these initiatives. Current funding for the programs does not include the additional manpower, travel, and equipment costs associated with the above initiatives. The LLNL and BNL are to submit funding proposals to DOE.
2. The DOE also agreed to develop an abstract for C.I.E.M.A.T. to present a paper at the Annual Health Physics Society Meeting and to send copies of translated documents to C.I.E.M.A.T.