

ADMGR:HDB

February 29, 1968

Dr. Eduardo Ramos
 Junta de Energia Nuclear
 Division de Medicina y Protection
 Avenida Complutense
 Madrid 3, Spain

Dear Eduardo:

Losing large airplanes full of weapons is indeed a very hard way to make friends. However, the same thing has resulted from the accident at Thule as at Palomares. Professors Jørgen Koch, Grande, Kofoed-Hansen, Rehberg, and a number of other members of the Ministry of Health or the Danish Atomic Energy Commission have become more than acquaintances. I am sure you know several of them already, and I don't need to enlarge on what fine people they are.

Like yourself, they recognize all the problems underlying the accident, and being men of good will, they immediately set about helping repair the situation. It is remarkable how a common scientific outlook can ease the process of becoming partners.

I can hardly think of two more dissimilar environments than Thule and Palomares. To some degree, each has characteristics of a desert, and if an accident had to happen, it is good that it did not happen over a highly inhabited area. Thule is at the head of a glacial bay having a capacity of about 50 cubic kilometers and is 100 square kilometers or more in area. It is frozen over between mid-September and the first of July. During the short summer the bay ice breaks up, large icebergs break off the glaciers, and the land, what little there is of it, dries up under a sun that shines nearly twenty-four hours a day.

Let me tell you in brief what has happened:

The B-52 lost all power and the crew was trying to make an emergency landing at Thule. The crew bailed out safely, except for one man, and they managed to survive the minus 35° to minus 40° cold. The unmanned plane, however, plunged toward the ice at an oblique angle, possibly at a speed greater than sound, grazed the ice, and the high explosive in all four weapons went off as it hit and began to disintegrate. The explosion completed the disintegration and ignited the fuel

US DOE ARCHIVES 826 U.S. ATOMIC ENERGY COMMISSION	
RG	
Collection	<i>DAS McCRAW</i>
Box	<i>16 Job 1320</i>
Folder	<i>MHS 3-9 Spanish Incident (1968)</i>

MEDICINE HEALTH & SAFETY - 3-9-68

BEST AVAILABLE COPY

which was freed from the fuel tanks. The result was a tremendous column of fire reaching to 800 meters in height and 300-600 meters wide. The fire was intense enough partly to melt the ice and when the fire burned out about forty-five minutes later, the water refroze and trapped bits of metal, carbon, unburned fuel, and plutonium. The next day all that was to be seen under photographic flares was a sort of dimpled area, probably created by the force of the explosion, at the head of a blackened stripe--about 800 meters long and 200 meters wide, with bits and pieces of metal scattered in all directions. The point of impact was almost dead center in the bay about eight miles from Thule Base.

I got to Thule while it was still dark twenty-four hours a day. At noontime, a soft twilight came on which was just enough to allow one to identify land contours and horizons. Even in such light, however, it was possible to find large pieces such as landing gear, the rotors out of the engines, and similar masses which had enough momentum to go skidding down the ice three to six kilometers from the black stripe.

It was quite an experience to tramp around in such extreme cold in arctic clothing. As long as one keeps moving briskly and the wind does not increase above 25 kilometers an hour, it is possible to stay reasonably comfortable, but with an increase in the wind or tiredness, one begins immediately to get chilly. The cold gave me a very subtle sensation of isolation, and it easier now to understand how one might get frostbitten or even freeze to death without being aware of what was happening.

The extreme cold made most of the radiological instruments inoperative. Even though they had been cold-tested, they were not able to work in such extreme cold. Many transistors did not work at these temperatures and dry cell batteries simply stopped after about five minutes. Insulation on wires would crack and short circuits developed wherever a voltage was greater than say 300 or 400 volts, despite the zero relative humidity. Brass fittings contracted and the lenses in surveying tended to get out of alignment, although of course they were useless because there was not enough light to make surveys for grids. It was only after instruments had become carefully cold-adapted and the sun came above the horizon about the 15th of February that it was possible to align a good geometrically accurate grid and systematically plot contamination levels and areas. It turned out that the best instrument for detection of the plutonium was a thin sodium iodide crystal connected to a photo-multiplier by a quartz crystal with a circuit gated to accept 17 and/or 60 kilovolt X-rays.

BEST AVAILABLE COPY

February 29, 1968

As was reported in the papers, parts of all four weapons were found and there is no doubt that the high explosive blew all of them to bits. These, of course, were collected first and sent back for examination. Subsequently, when weather permitted (which is to say between storms), men have walked patterns across the ice shoulder to shoulder picking up bits and pieces as they went. Each storm tends to uncover a few more pieces from the snow, or cover others, but the collections are now at the point of diminishing returns. All these pieces will be returned to Oak Ridge for disposal. The last part of the clean-up will require the removal of the ice making up the black area containing the carbon, the jet fuel, and bits of plutonium. There doesn't seem to be any great problem in scraping this up, but there is disagreement among ourselves as to the best way to separate the oil and plutonium from the melted ice. I am confident that there will be so little plutonium remaining on the rest of the ice, and going into the bay when the ice finally melts in July, that I would be willing to drink it--that is I'd drink it if I had not seen a microscopic slide of the plankton, etc. (crud) normally present in the water of the bay.

The Danes will take care of the monitoring-surveillance of the several food chains that the native Greenlanders depend upon for food. They are hunters living on seal, birds, and walrus, the latter going for the dogs. Accordingly, survey of the intestinal contents of seal, the droppings of birds, and the mussels (shellfish) on which the walrus feed should give a pretty fair picture of the situation. However, they will sample irregularly other items such as fish, foxes, and the occasional arctic hare. After the snow melts there is a "dry" season for a period of about a month when what little soil there is on the sides of the mountains blows around like the snow does in winter. The Danes questioned whether plutonium might get into the soil and therefore be subject to inhalation by the Greenlanders when they hunt birds. I cited your experience as of last spring on resuspension, but I wonder whether Emilio has found contaminated dust samples after he began putting the sampler closer to the surface. Your opinion on this matter of resuspension and airborne translation of plutonium would be very much appreciated.

There isn't much more to tell except that we are now in the process of putting together our observations and taking stock of the lessons we learned. In both Palomares and Thule, we were handicapped by instrument failure, and I hope this teaches everyone the importance

DOE ARCHIVES

BEST AVAILABLE COPY

Dr. Eduardo Ramos

- 4 -

February 29, 1968

of good radiologic instruments. An obsolete or inappropriate instrument is worse than none.

I am now trying to get back into the swing of routine matters including our perennial problems with Packard Instrument Company. Wright is pushing them, and I will help him keep up the pressure. It is good to know that you have solved the high background problem in your counter. Our people have encountered the same problem you have, and in general have found the same solution.

Mr. Malmstrom, our representative in London, reported that the British put on their documentary about January 26, but it seems to have caused hardly a ruffle in England. They will sell the film or tape for reshooting by anyone with the money, so we are not free of it yet.

As soon as you have made a decision on the solid state detector best suited to your work, please let us know how we can help you obtain it.

Mrs. Grimes was very pleased with your kind words. I agree with you that there is a striking resemblance. It was such that with great reluctance I put the picture in her hands for her to take home-- another reason for my coming to Madrid! Seriously, all foreign travel is out until after July. I used the last bit to go to København.

I am working on translations of the pulmonary lavage book and the newspaper clippings which you were kind enough to send. When you see the good people of Palomares, please tell them that I am very moved by their holding a mass for our airmen.

I will write again soon.

With very best regards from all of us.

Sincerely yours,

BEST AVAILABLE COPY

H. D. Bruner, M.D.
Assistant Director for
Medical and Health Research
Division of Biology and Medicine

DOE ARCHIVES

OFFICE ▶	ADMHR					
SURNAME ▶	HDBruner.pwg					
DATE ▶	2/29/68					