



LAWRENCE LIVERMORE LABORATORY

Biomedical Sciences Division

May 26, 1978

Dr. Bruce Wachholz
Division of Biomedical and
Environmental Research
Department of Energy
Washington, D.C. 20545

Dear Bruce:

Enclosed is my preliminary proposal. I did not know how detailed to make it or quite what the format should be. I think it does cover the topics, and the details need to be discussed by the three of us. I am now obtaining cost estimates and equipment lists and will have them ready when we get together.

Sincerely yours,

Phillip N. Dean

PND:pjm

cc: Dr. C.R. Richmond, ORNL

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Collection 1320
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Folder 1-

PRELIMINARY PROPOSAL

The contaminated area at Palomares was originally divided into three areas; II, III, and V. Activity levels in Areas III and V are such that no new action is required or proposed regarding them. Current monitoring procedures should be continued. In the original decontamination action area II was treated differently from the others. It was mostly uninhabited with rocky and hard soil. The fallout pattern extended over some tilled ground, which received the deep plowing treatment. Soil at ground zero was removed, the remaining area was raked and watered. Initially two air samplers were located in this area. For many years little activity was detected in the air showing that resuspension was minimal. Due to mechanical difficulties these air samplers were eventually removed; no air data has been available for several years. Ground surveys of the entire Palomares area were made in 1966, none have been made since then. As a result of relatively recent farming activity in area II it is now advisable to resurvey the situation in Palomares, particularly in area II. This survey should be very thorough and should use the best technology and guidelines available. The following procedure is recommended.

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1. The activity levels throughout Palomares should be determined.
 - a. A ground survey of Area II should be made to establish the current surface activity level and extent of contamination. Original surveys of this area yielded surface activities in excess of $32 \mu\text{Ci}/\text{m}^2$ in the inner region, a total activity in excess of 2 Ci. The next zone, a considerably larger area, had a total activity greater than 1 Ci. We know that much of this activity has penetrated the soil but we don't know how much. The FIDLER instrument should be used for this survey.

- b. Spot checks of surface activity should be made throughout Palomares.
- c. Since any ground survey instrument measures only the activity in the top 1 mm of soil, further measurements are necessary to establish the true inventory of material. It is recommended that one centimeter deep samples be taken throughout area II to correlate surface measurements with total activity. These soil samples can be assayed by the use of a GeLi detector.

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- 2. All contaminated plants should be removed from area II.
- 3. Ground activity levels should be reduced to "acceptable" levels. What constitutes acceptable is subject to debate. The levels used at Palomares in 1966 were removal of soil above $3.2 \mu\text{Ci}/\text{m}^2$, deep plowing out to $0.32 \mu\text{Ci}/\text{m}^2$. DOD guidelines call for achievement of surface levels of $61 \mu\text{Ci}/\text{m}^2$. The ICRP guideline of $1 \text{ pCi}/\text{m}^3$ of air translates to a surface activity of $1000 \mu\text{Ci}/\text{m}^2$. Both of these guidelines are unacceptable. I recommend following either Healy's suggestion of $0.4 \mu\text{Ci}/\text{m}^2$ in the top mm, $4 \mu\text{Ci}/\text{m}^2$ in the top 10 mm, or the EPA screening level of $0.26 \mu\text{Ci}/\text{m}^2$, whichever is accepted by DOE. The EPA number reflects an air concentration of $1 \text{ pCi}/\text{m}^3$ and a lung dose of 1 mrad/yr. Since the EPA number is based on a specific type of soil and resuspension criteria I recommend that a measurement of particle size distributions be made and resuspension factors be determined.

To accomplish the reduction in surface activity I suggest burial of all soil with activity above $3.2 \mu\text{Ci}/\text{m}^2$, on-site near ground zero. The topography of this area could be totally changed. Such a drastic change must be approved by the Spanish in Palomares but I believe it would be acceptable. It would increase the amount of tillable soil. Of course all soil movement should be done after raking and water of the soil. All other soil contaminated above the acceptable level should be plowed.

4. Air samplers should be installed at ground zero in area II, and at the original 2-1 and 2-2 sites.
5. Crops grown in all areas of Palomares should continue to be sampled.
6. Buildings, vehicles, etc., near or in area II should be surveyed for alpha activity.
7. Small animals living in Palomares, particularly near area II should be sampled routinely.
8. Routine bioassay procedures (urinalysis and chest counting) should be established for a control group of Palomares residents.

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