

THE UNIVERSITY OF MICHIGAN

SCHOOL OF PUBLIC HEALTH

ANN ARBOR, MICHIGAN 48109

Department of Environmental
and Industrial Health

MEMORANDUM



TO: Nancy Dennis
FROM: Phillip Plato
DATE: February 5, 1981
RE: Progress Report No. 36, Contract No. NRC-01-77-180, January, 1981.

Site Visits

Twelve of the 59 processors that participated in Tests #1 and #2 were contacted during January to determine if they were interested in us visiting their facility. Seven of the processors declined, and five accepted and were visited. Some of those that declined did so because they were never doing their own primary dosimetry but simply wanted to test their commercial service or their environmental TLD system. One processor declined because they ceased doing their own personnel monitoring due to the anticipated cost of a future mandatory testing program.

Some processors declined a site visit at this time but would like to invite us at a later date. This response is usually due to the fact that the processor is making a major change in their dosimetry and would like the site visit after the change has been completed. We have been telling these processors that we cannot guarantee the availability of travel funds after February 15, but that we will attempt to accommodate their needs if possible.

Table 1 shows the current status of the site visit program for the 59 processors. Seven processors remain to be visited.

I still have not heard from you concerning site visits to processors who did not participate in Tests #1 and #2 but who intend to participate in Test #3.

The Standard

Working Group 1.4 of the Health Physics Society met, hopefully for the final time, on January 27 and 28. I attended the meeting as a committee member. Several significant decisions were made concerning the Standard including:

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1. There will be only one neutron category, californium-252 moderated with heavy water. This will be a neutron-plus-gamma category within the dose mixture ratio of 3:1 as required by the other mixture categories.
2. The values of C_x calculated by Harwell were adopted for several reasons:
 - a. They are based on a sphere of tissue instead of a parallelepiped. The sphere is the international geometry for dosimetry.
 - b. Harwell used a 4-element tissue model instead of the 11-element model used by some other groups.
 - c. Their calculated values of C_x agree closely with the calculated values from GSF and the measured values from PTB.
3. The radiation sources that must be used for the low-energy photon category will consist of six NBS X-ray techniques with average energies from 20 keV to about 85 keV. One additional NBS technique, HFD, was eliminated as were the k-fluorescence sources.
4. The Standard will not contain the C_x values for a variety of mono-energetic photons. Instead, \bar{C}_x values will be given for the six NBS X-ray techniques specified in the Standard, and C_x values will be given for cesium-137, the high-energy photon source required.
5. The Standard will continue to require each dosimeter to report a shallow (7 mg/cm^2) and a deep (1000 mg/cm^2) dose equivalent. Consideration was given to also testing the ability of a processor to measure doses for the lens of the eye (300 mg/cm^2) as required on the back of the NRC's Form 5. A test at 300 mg/cm^2 was rejected for two reasons. First, although some dosimeters could be calibrated to provide doses at three depths for a testing program, this would imply that the dosimeters can do as well under field conditions. It is probably optimistic to believe that dosimeters are accurate for field use at two depths; three depths is stretching this optimism to the breaking point. Second, the local health physicist can assign either the shallow or the deep dose to the lens of the eye in the field, depending on knowledge available concerning the type of radiation to which a worker is being exposed.
6. In spite of the opinion of the majority of Working Group 1.4, the angular dependence observation will remain in the Standard.

Time Schedule for Test #3

I suspect that March 1 is the soonest that a typed draft of the Standard can be produced with the recent changes made by Working Group 1.4. The Standard must then go to ANSI Committee N13 for their approval

which will not be forthcoming until April 1 at the soonest provided that the Standard does not need to be reballoted by the entire Committee. I assume that the HPSSC will not review the Standard again.

It is my understanding that Test #3 is to be conducted according to the final version of the Standard. If this means the final version approved by N13, we are most likely at least two months from having the final version. If the processors are to be given some time, perhaps two months, to read the Standard and adjust their procedures accordingly before they participate in Test #3, then Test #3 will not begin until sometime this summer (the large uncertainties inherent with such fortune telling require that time be measured by the season rather than by the month).

If this time schedule is not acceptable to you, then you and we should discuss the alternatives immediately. If this loose schedule is acceptable, then I suggest that Joe Miklos and I proceed as follows. We will continue to prepare the radiation sources required for Test #3 as discussed below. We will also continue to provide any advice and assistance required by the processors relevant to their preparations for Test #3. When the Standard has been approved by ANSI Committee N13, we will consider the Standard to be finalized and will send a copy to each processor as part of their invitation to participate in Test #3. We will schedule the start of Test #3 for two months after the invitations are mailed. Half the processors will participate during the first three months of Test #3 and the other half will participate during the second three months. We will be able to complete our final report within three months of the conclusion of Test #3 (the second group of processors can take up to 60 days after the conclusion of Test #3 to report their results).

The only problem we have with this flexible time schedule is that we might overspend our present NRC contract which is to terminate at the end of September. Our main expenses while waiting for Test #3 to begin are 100% of Joe's salary and 50% of mine. We should discuss the financial implications of our anticipated time schedule with you as soon as possible.

Radiation Sources

We finally received word from J.L. Shepherd that our 20 Ci and 400 Ci cesium-137 sources will be shipped to us on February 13, four weeks behind schedule. Our ionization chambers are currently at NBS for calibration. Thus, when the sources do arrive, we will be ready to calibrate them.

We received the 30 cm sphere of heavy water that will be used to moderate the californium-252 source. Considerable time was spent during January removing our old californium-252, shipping it back to NBS, and installing and testing the sphere.

The new californium-252 source is being fabricated at Oak Ridge. The last we heard was that the source had broken while still at Oak Ridge and was, hopefully, being redesigned. We are not sure when the source will be sent to us.

Summary

It is difficult to say that we are on schedule since we no longer seem to have a schedule. The site visits to the processors who participated in Tests #1 and #2 will be completed during February as planned. The radiation sources required for Test #3 are being assembled more slowly than anticipated, but so is the Standard. Our expenses to date are as planned. Therefore, it is safe to conclude that the pilot study is progressing as rapidly and inexpensively as possible.

Phillip Plato

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PP/mf
cc: Ray Gustave

Table 1. Current status of site visits to processors that participated in Tests #1 and #2 of the pilot study.

Status *	Processor
visited	Argonne National Laboratory
visited	Arkansas Power & Light Co.
declined	Armed Forces Radiobiological Res. Inst.
visited	Atomic Energy Industrial Laboratories
visited	Atomic Radiation Laboratory
visited	Baltimore Gas & Electric Co.
declined	Battelle Pacific Northwest Laboratories
visited	Bethlehem Steel Corporation
	Bettis Atomic Power Laboratory
	Brookhaven National Laboratory
declined	Broward General Medical Center
visited	Bureau of Medicine & Surgery
	Carolina Power & Light Co.
declined	Charleston Naval Shipyard
visited	Consumers Power Co.
visited	Dept. of Energy, Idaho Operations Office
visited	Duke Power Co.
declined	Duquesne Light Co.
visited	Eberline Instrument Corporation
visited	Florida Power & Light Co.
declined	General Electric Co.
visited	Harvard University
declined	Health Physics Northwest
visited	ICN Pharmaceuticals
visited	Landauer, R.S., Jr. and Co.
declined	Lawrence Radiation Laboratory
visited	Lexington-Bluegrass Army Depot
visited	Los Alamos Scientific Laboratory
visited	Mason & Hanger
	Monsanto Research Corporation
	National Bureau of Standards
declined	Naval Electronic System Command
visited	Naval Research Laboratory
visited	New England Nuclear
declined	Nuclear Sources and Services
declined	Nurnberger Radiation Protection Service
visited	Oak Ridge National Laboratory
visited	Omaha Public Power District
visited	Public Service Electric & Gas Co.
visited	Radiation Detection Co.
visited	Radiation Management Corporation
visited	Reynolds Electric & Engineering Co.
visited	Rockwell International
declined	Rutgers University
visited	Sandia Laboratories
	Savannah River Plant
visited	Siemens Gammasonics (Searle)
declined	Southern California Edison Co.
visited	Teledyne Isotopes
visited	Tennessee Department of Public Health
visited	Tennessee Valley Authority
declined	Toledo Edison Co.
	United States Air Force, Brooks AFB
visited	United States Testing Co.
visited	University of Utah
	Virginia Electric & Power Co.
declined	Washington State Dept. of Health
declined	Welex
visited	Yankee Atomic Electric Co.

* Status: visited = site visit has been completed
declined = processor declined a site visit
blank = site visit not yet conducted