Mike —
This is a Res + Tech Rpt.
Lynn Scattolini

NOTE TO: Document Control
Room 016

FROM: Nancy A. Dennis
Occupational Hlth Stds Branch

Please place the attached document in the PDR using the following file and file points:

WHAT PART OF 10 CFR.

PDR File (Select One)	Related Documents (Enter if appropriate)
DOSIMETRY ✓	
Proposed Rule (PR) _____	ACRS Minutes No. _____
Reg. Guide _____	Proposed Rule (PR) _____
Draft Reg. Guide _____	Draft Reg. Guide _____
Petition (PRM)	Reg. Guide _____
Effective Rule (RM) _____	Petition (PRM) _____
	Effective Rule (RM) _____
	Federal Register Notice _____
	SD Task No. CH-SD-1
	NUREG Report _____
	Contract No. NRC-1-80-150

Subject: Progress Report No. 2
Contract No. NRC-1-80-150
April 1982

1

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: May 2, 1980

RE: Progress Report No. 28, Contract No. NRC-01-77-180, April, 1980

Value/Impact Statement

We invited all processors that participated in the two-year pilot study and all other processors known to us to attend a one-day meeting with their peers to discuss values and impacts to them of a dosimetry testing program. Three separate meetings were held in Ann Arbor, MI. On April 23, we met with the private in-house processors, (nuclear power reactors, medical facilities, universities, etc.), on April 25 we met with Government-affiliated in-house processors (National Laboratories, prime DOE contractors, the military, etc.), and on April 29 we met with the commercial processors.

Representatives from approximately 20 private, 20 Government, and 7 commercial processors attended their respective meetings. An agendum that was followed for each meeting is attached.

These meetings served two purposes. First, they provided a forum for the processors to discuss the consequences to them of the various alternatives shown in the agendum. Second, they provided us with new insights to their problems. We believe the Value/Impact Statement will be strengthened because of these meetings.

We have begun to write our report to you concerning the various alternatives that we expect will be covered in the Value/Impact Statement. Our report should be completed by May 15. We hope you will find the report helpful for your Workshop in Washington on May 28-29.

Site Visits

During the three meetings in Ann Arbor described above, we discussed the upcoming site visits with many of the processors. All that we spoke with seemed receptive.

Conclusion

Our contribution to the Value/Impact Statement is on schedule. We expect to begin the site visits by the end of June and complete them by the end of summer.

Phillip Plato

PP/mf

AGENDA OF MEETING TO DISCUSS A MANDATORY
PERSONAL DOSIMETRY TESTING PROGRAM

Ann Arbor, Michigan

I. Proposed Action

A. Description: All processors of personal dosimeters in the United States shall be required to have their performance tested on a regular basis.

B. Need

1. Results of the two-year pilot study of the HPSSC/ANSI Standard (ANSI N13.11).

2. Uses and abuses of epidemiological studies.

3. Some workers are being exposed to types of radiation for which their dosimeters are not sensitive.

4. Experience with the National Sanitation Foundation shows that a voluntary testing program is not successful due to a lack of participation by the majority of processors.

5. Need for uniform procedures for calibrating dosimeters and reporting of doses.

C. Values and Impacts of the Proposed Action

1. Value

a. Improvement in the accuracy of personal monitoring.

b. Improvement in quality control procedures of processors.

c. Advertising potential for commercial processors that perform satisfactorily.

d. Uniform procedures for calibrating dosimeters and reporting doses.

2. Impact

a. Financial cost

(1) Testing fee

(2) Time requirements of processor personnel

(3) Loss of business for commercial processors that perform poorly.

b. Increase or decrease in reported doses due to changes in calibration procedures.

c. Shift of users from a processor (commercial or in-house) that performs poorly to a processor that performs satisfactorily.

D. Recommendation on the proposed action

1. Accept a mandatory testing program

2. Accept a voluntary testing program

3. Accept a testing program

II. Technical Alternatives

A. Advantages and disadvantages of using ANSI N13.11.

B. Advantages and disadvantages of using an ISO standard.

C. Advantages and disadvantages of using the National Sanitation Foundation's standard.

D. Use of other standards.

E. Recommendation on which Standard to use.

III. Procedural Alternatives

A. Frequency of testing

B. Type and number of testing laboratories

1. Laboratory operated by the NRC

2. Laboratory operated by a National Laboratory

3. Laboratory operated by another Government agency

a. NBS

b. OSHA

c. EPA

4. Private laboratory under contract to the NRC

5. Several laboratories as determined by free-market competition

C. Technical supervision of the testing laboratory

1. Monitored by NBS

2. Monitored by a peer-review committee

3. Monitored by a Certification and Review Board

D. Appeals procedures

1. Appeal to a peer-review committee

2. Appeal to a Certification and Review Board

3. Appeal to an HPSSC/ANSI standards committee

Table 1. Summary of the HPSSC Standard used in the pilot study.

	Radiation Category	Interval	Test Range	Number of Dosimeters Per Test	Tolerance Level (L) (see footnotes) Shallow (7 mg/cm^2)	Deep (1000 mg/cm^2)
I.	Gamma (Co-60)	1 Accident:	10-800 rad	10	no test	a
		2 Protection:	30-100 mrem	10	no test	b
		3	101-300 mrem	10	no test	b
		4	301-10,000 mrem	10	no test	b
II.	X Ray (30-300 keV)	1 Accident:	10-800 rad	10	no test	a
		2 Protection:	30-100 mrem	10	c	c
		3	101-300 mrem	10	c	c
		4	301-10,000 mrem	10	c	c
III.	X Ray (15-30 keV)	Accident:	no test			
		1 Protection:	150-300 mrem	10	c	c
		2	301-10,000 mrem	10	c	c
IV.	Beta (Sr-90)	Accident:	no test			
		1 Protection:	150-300 mrem	10	c	no test
		2	301-10,000 mrem	10	c	no test
V.	Neutrons (Cf-252)	Accident:	no test			
		1 Protection:	100-300 mrem	10	no test	c
		2	301-5,000 mrem	10	no test	c
VI.	Photon Mixtures (Cat. I & II)	Accident:	no test			
		1 Protection:	50-100 mrem	10	c	c
		2	101-300 mrem	10	c	c
		3	301-10,000 mrem	10	c	c
VII.	Photon and Beta Mixtures (Cat. I or II & IV)	Accident:	no test			
		1 Protection:	200-300 mrem	10	c	c
		2	301-10,000 mrem	10	c	c
VIII.	Photon and Neutron Mixtures (Cat. I & V)	Accident:	no test			
		1 Protection:	150-300 mrem	10	no test	c
		2	301-5,000 mrem	10	no test	c

For each dosimeter, a performance index is calculated by:

$$P = \frac{H' - H}{H}$$ where: H = delivered quantity, H' = reported quantity

For each depth of each interval, an average performance index, $\bar{P}$, and its standard deviation, S, are calculated.

A processor passes a category if, for each depth of each interval:

$$|\bar{P}| + 2S \leq L$$

where:

a: $L = 0.3$

b: $L = 0.3$ or $6/\sqrt{H}$ whichever is larger

c: $L = 0.5$ or $15/\sqrt{H}$ whichever is larger

Table 4. Test categories, test irradiation ranges, and tolerance levels of the revised HPSSC Standard.

Test Category[1]	Test Irradiation Range	Tolerance Level, L, for Deep[4]	Tolerance Level, L, for Shallow[4]
I. Accidents, low-energy photons (NBS technique MFI [6])	10 to 500 rad	0.3	no test
II. Accidents, high-energy photons (^{137}Cs gamma radiation)	10 to 500 rad	0.3	no test
III. Low-energy photons (NBS techniques LG, LI, LK, MFC, MFG, MFI, HFD [6][2] or K-fluorescence radiation of energy $\geq$ 20 KeV [7][3])	0.03 to 10 rem	0.5	0.5
IV. High-energy photons (^{137}Cs gamma radiation)	0.03 to 10 rem	0.5	no test
V. Beta particles (^{90}Sr - ^{90}Y)	0.15 to 10 rem	no test	0.5
VI. Photon mixtures (any combination of categories III and IV)	0.05 to 5 rem	0.5	0.5
VII. Mixtures, photons and beta particles (any combination of categories IV and V)	0.20 to 5 rem	0.5	0.5
VIII. Mixtures, neutrons and photons (^{252}Cf, bare, either alone or combined with category IV)	0.15 to 5 rem	0.5	no test
IX. Mixtures, neutrons and photons (^{252}Cf, moderated by 15 cm of D_2O, either alone or combined with category IV)	0.15 to 5 rem	0.5	no test

Notes:

(1) All test categories except the first two which are specifically marked "Accidents" apply to protection dosimetry. Each test category requires 15 dosimeters.

(2) One of the specified techniques shall be selected at random for each test.

(3) If requested as an alternate to NBS techniques, K-fluorescence radiation shall be selected at random from at least 5 choices.

(4) A category is passed if $|\bar{P}| + S \leq L$ where P, $\bar{P}$, and S are defined in Table 1.