

Minutes of: ASA Sectional Committee N5.4 - Use and Handling of
Radioisotopes and High Energy Radiation

Place: Mayflower Hotel, Washington, D. C. 716754

Date: March 4, 1959

The meeting was called to order at 9:15 a. m. on March 4, 1959, in the Pan American Room, Mayflower Hotel, Washington, D. C. by the Chairman. The minutes of the meeting on January 29, 1959 were read, and approved as corrected.

Members Present

- Paul C. Aebersold - U. S. Atomic Energy Commission
- ✓ E. E. Beauchamp - Oak Ridge National Laboratory
- S. H. Brown - National Lead Company
- ✓ M. Brucer - Oak Ridge Institute of Nuclear Studies
- ✓ James J. Byrnes - Associated Nucleonics, Inc.
- H. M. Clark - Rensselaer Polytechnic Institute
- G. Walker Daubenspeck - Bureau of Labor Standards
- Luther Eggman - Industrial Nucleonics Corporation
- G. M. Foley - Leeds and Northrop Company

- J. C. Lang - Atomics International
- ✓ S. Allan Lough - U. S. Atomic Energy Commission (Secretary)
- P. J. Mraz - E. I. du Pont de Nemours
- N. E. Parnell - Cities Service Research and Development
Company (for Dan Milsom)
- N. A. Powell - Allison Division of General Motors
- David H. Rest - Quartermaster Food and Container Institute
- ✓ Charles R. Russell - General Motors Research Laboratories
(Chairman)
- ✓ L. C. Schwendiman - General Electric Company
- ✓ L. G. Stang - Brookhaven National Laboratory
- ✓ A. J. Stevens - Nuclear Systems
- ✓ John H. Tolan - Lockheed Aircraft Corporation
- W. A. Wilson - Standard Oil Company (Indiana)

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BOX # 3

DATE Gen. Congress. March 1959

GUESTS

Mathew M. Braidech - National Board of Fire Underwriters
(Chairman N5. 5)
Sam B. Garfinkel - National Bureau of Standards
O. J. Gatchell - American Machine and Foundry Company
(Nuclear Standards Board)
Henry G. Lamb - American Standards Association
T. O. Menary - E. I. du Pont Company (N5. 5)
S. I. Winde - E. I. du Pont de Nemours and Company
(Nuclear Standards Board)
T. C. George - Bureau of Explosives

Receipt was reported of the February 16, 1959 letter from Henry G. Lamb, Secretary, Nuclear Standards Board, with which was enclosed document ISO/TC85/SC4 (Secretariat -3)3 from Poland, a notice of a meeting to be held in Warsaw April 21 and 22. Mr. Lamb urged that ASA SCN^{5. 4} arrange to send a delegation to this meeting.

After a review by General Gatchell of the significance of this meeting, the following persons indicated their willingness to represent the subcommittee:

<u>NAME</u>	<u>AFFILIATION</u>	<u>CONTACT</u>
C. R. Russell	General Motors Research	L. R. Hafstad G. M. Research Warren, Mich.
Patrick J. Selak	Kaiser Engineers Division of Henry J. Kaiser Co.	George Havas Gen. Mgr. and V. P.
Mathew M. Braidech	National Board of Fire Underwriters	Lewis A. Vincent Gen. Mgr. NBFU
L. C. Schwendiman	General Electric Co. Richland, Washington	D. W. McLenagun Gen. Elec. Co. Richland, Wash.
J. C. Lang	Atomics International Canoga Park, California	Dr. C. Starr V. P. and Gen. Mgr.
D. H. Rest	Quartermaster Food and Container Institute for Armed Forces	Maj. Gen. McNamara The Q. M. General

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NAME	AFFILIATION	CONTACT
N. A. Powell	General Motors Allison Division	T. F. Nagey Allison Division Indianapolis, Ind.
Walter Seibyl	NDA 5 New Street White Plains, N. Y.	Dr. Phillip S. Mittle- man Mgr., - Phys. Sect.

Steven Lawroski, Argonne National Laboratory and Vice-Chairman, N5, was included in the delegation on the basis of a telephone conversation with him at Mr. Winde's suggestion.

The subgroups retired to prepare their comments on the Polish agenda. The subcommittee reconvened at 11:30 a. m. to hear oral reports of subgroup chairmen. These five subgroups submitted written reports by mail. Copies of these reports are attached.

The Chairman read the draft of a letter he proposes to send to Mr. Winde to report recommendations of N5.4 on the Polish agenda.

Dr. Lough discussed briefly the respective roles of the NCRP, ICRP, ILO, ISO, and IAEA.

General Gatchell commented upon the informal agreement, reached at Harrogate last year, under which the IAEA will promulgate codes of practice and the ISO will consider adoption of parts of these codes in the ISA standards.

The Chairman asked whether the subcommittee should consider the IAEA code for adoption as an ASA standard. Marshall Brucer, M. D., referred to specific sections as grossly inadequate and unsatisfactory.

Each member present was asked to suggest objectives for further work by this subcommittee. A brief summary of the suggestions follows:

Byrnes: Urge NBS to revise Handbook 42 with aid of those currently using radioisotopes. This would require reorganization of the NCRP subcommittee involved. Suggest that ASA might participate in revision of NBS 42.

- Lamb: Subcommittee N5.4 might offer participation to Lauriston Taylor, Chairman of NCRP.
- Braidech: Urged definition of objective in ASA standards on radioisotopes.
- Seibyl: Considered first job is statement on physical properties of isotopes. Urged selection of specialists to participate.
- Schwendiman: Urged adherence to engineering aspects. Facilities for handling radioisotopes would be a tangible subject.
- Stang: Urged work on certain limited specifics.
a. Standardization of lead brick sizes.
b. Standardization of manipulator mounting heights.
c. Standardization of viewing windows.
d. Standardization of gloves for dry boxes.
- Beauchamp: Urged emphasis on determination of those things which lend themselves to standardization.
- Powell: Believed that national standards should appear before international standards are announced. For this reason, urges prompt action by ASA. Two topics for immediate attention are:
a. Transport problems.
b. Facilities.
- Lang: Suggested work on criteria for laboratory design; urged review of IAEA code to salvage what is good.
- Tolan: Suggested standardization of techniques for measurement. Schwendiman pointed out that N3 deals with nuclear instrumentation.
- Rest: Urged standards for control of high energy radiation from machines.
- Foley: Advised emphasis on standards of help to installations accommodating small, low-level users.
- Byrnes: Urged selection of published information on the physical data on radioisotopes. Similarly, would select published papers on measurement techniques

- Byrnes:
(cont'd.) and approve them. Would have a representative group from N5.4 cooperate with NCRP to prepare a handbook on safe handling of radioisotopes.
- Wilson: Felt that N5.4 is too large for effective action at the working level. Suggested that one person be employed to write a standard. Then N5.4 could edit, comment, revise, and finally approve.
- Clark: Pointed out that N3 prepared an index of standards on nuclear instrumentation, looked at specifications and standards and determined whether these were appropriate as ASA standards.
- Suggested a similar procedure for N5.4. Felt that ISO outline (TC85/SC4) should be held on to as a guide, since N5.4 has a large investment in it by this time.
- Eggman: Pressed for revision of NBS Handbook 42. Urged that effort be directed toward help of small users. Maximum permissible doses and concentrations should be reworked to reconcile the different and conflicting recommendations which have appeared.
- Stevens: Should draw up standards to govern certain uses which are widely applied at present. Of these, the most important are radiography and gaging.
- Brucer: Pointed out need for standardization in the medical field. For example, medical casualty services (as related to radiation injury) need standardization, as do qualifications of personnel. It was pointed out that these topics might be beyond (the scope) of N5.4.

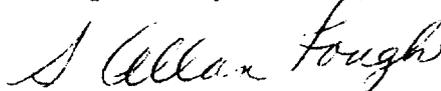
Mr. Winde made some remarks which served to orient the members of Subcommittee N5.4 with regard to relationships between various working groups. He mentioned that when the Nuclear Standards Board was set up, it was expected that there would be some conflicts and duplication with groups outside the ASA, as well as some overlapping of interest

among the subcommittees of N5. ASA Sectional Committee N5 was set up initially to deal with chemical engineering for the nuclear field. Sectional Committee N5 was appointed by the Nuclear Standards Board to be a participating member of the ISO/TC85 committee on isotopes. Thus Subcommittee N5.4 had its role broadened beyond purely engineering phases as originally outlined. For example, N3 deals with techniques of measurement, but at the international level N5.4 is involved in radioisotope measurement. N3 and N5.4 would be expected to cooperate in preparing material for use by N5.4 at the international level. Similarly, medical casualties are the concern of N7, unless the problems involve radioisotopes in international discussions; then N5.4 would function on medical casualties. Mr. Winde urged that N5.4 retain the organization into the five subgroups which dealt with the Polish agenda, with the understanding that people will move from group to group according to their interests and talents.

The Chairman announced that the five groups will be continued.

The next meeting will be announced later by mail. One suggestion was that it be held in Cleveland, April 5-10, on the occasion of the meeting of the Nuclear Congress and Atom Fair.

Respectfully submitted,



S. Allan Lough
Secretary

for Charles R. Russell
Chairman

Appendix

Correspondence from James J. Byrnes to S. Allan Lough - 3/18/59
Re: Comments of Minutes of Meeting of Subgroup 1 of ASA Committee N5.4

I have just received a letter from Dr. Garfinkel commenting on the minutes of the meeting of Subgroup 1 of ASA Subcommittee N5.4 held in the Mayflower Hotel on March 4, 1959. A copy of the letter is attached and is self-explanatory.

In a previous letter Dr. Garfinkel informed me that Dr. W. B. Mann of the Radioactivity Section, National Bureau of Standards, is Chairman of NCRP Subcommittee M-1 that is preparing a publication entitled "Manual for Radioactivity Procedures". Yours truly, James J. Byrnes

Correspondence to James J. Byrnes from S. B. Garfinkel - 3/13/59

I have just received my copy of the minutes of Subgroup 1 of ASA Committee N5.4, and would like to forward several corrections.

The National Bureau of Standards issues standard samples of radioisotopes, and certifies as to the activity and chemical content of these samples, but the National Bureau of Standards is not responsible for the specification of methods of measurements, as was stated in the last paragraph. Nor is the National Bureau of Standards responsible for the establishment of specifications of radioactive materials.

Two other minor points: Howard Seliger's name is misspelled, and I am listed as a member of the subgroup. I was present at the meeting, having been invited as a guest by Dr. Aebersold. In the event that I were invited to become a member, it would be necessary for the National Bureau of Standards to approve the membership. Very truly yours,
S. B. Garfinkel, Physicist, Radioactivity Section.

Correspondence from James J. Byrnes to Members of Subgroup 1 ASA Committee 5.4 - 3/9/59

Attached herewith are the minutes of the second meeting of Subgroup 1 held in the Mayflower Hotel in Washington, D. C. on March 4, 1959. Yours truly, James J. Byrnes.

Minutes of March 4, 1959 Meeting of
Subgroup 1 of ASA Subcommittee 5.4

The second meeting of Subgroup 1 was held at the Mayflower Hotel, Washington, D. C. on March 4, 1959 during the regular meeting of ASA Subcommittee 5.4. The members of the subgroup present at the meeting were as follows:

Paul C. Aebersold - Acting Chairman
James J. Byrnes - Acting Secretary
Samuel B. Garfinkel
David H. Rest
John H. Tolan

The subgroup gave further considerations to Items 1 and 2 of the Polish outline, with the following findings.

Radioactive
1. Physical Properties of *Radio* the Isotopes

The subgroup reviewed the section on "Physical Properties of the Isotopes" and concluded that it properly belonged in the outline and that the ASA procedure in establishing standards for the physical properties would be to adopt the data of some nationally accepted group concerned with this subject. Accordingly, the subgroup reviewed the four agencies dealing with the physical properties of radioisotopes, which are as follows:

A. International Commission on Radiological Units and Measurements, which has a Subcommittee on Standards of Radioactivity.

B. The Committee on Nuclear Science of the National Research Council, which has a Subcommittee on beta and gamma standards. This subcommittee does not set standards, but discusses technical means of standardization, indicates isotopes that need standardizing, and discusses intercomparisons.

C. The A. S. T. M. Committee E10 has two groups working in this field.

1. A general committee on isotopes under Bill Lyons of ORNL.

2. A committee on absolute measurement under Howard Sellinger.

The two groups develop approved ASTM testing methods used by industry.

D. National Committee on Radiation Protection which has two groups to work out a manual concerned with primary and secondary standards and methods of measurement for radioisotopes.

This manual will not actually select values, but will concern itself with methodology.

The Committee concluded that none of the four agencies mentioned above constituted an official national source for information on the physical properties of the radioisotopes.

Recommendation on Item 1: The ASA representative to the ISO meeting in Poland should recommend that the Polish outline be modified to read as follows:

1. ^{Radiation} Physical Properties of the Isotopes

- 1.1 Type of Radiation
- 1.2 Radiation Energy
- 1.3 Type and Scheme of Disintegration
- 1.4 Half-Life

The representative should further advise ISO that there is no national group that officially establishes the physical properties of radioisotopes. Instead, several sources of these data are used, which are as follows, in order of preference:

1. Nuclear Data Sheets of National Academy of Science
2. Trilinear Chart of Nuclides by W.H. Sullivan
3. Types of Isotopes by D. Strominger, J.N. Hollander and G.T. Seaborg; Rev. Mod. Phys., 30, 585-904 (1958)

2. Establishment of Specification for Radioactive Materials

The committee discussed this section of the Polish outline and concluded that it belonged in the outline. It is the belief of the subgroup that the National Bureau of Standards is the legal national agency covering the establishment of specifications for radioactive materials and that the work of the subgroup would consist of adopting the methods and standards recommended by the National Bureau of Standards.

Recommendations on Item 2: The ASA representative to the ISO meeting in Poland should recommend that the Polish outline be modified to read as follows:

2. Establishment of Specifications for Radioactive Materials

2.1 Activity

- 2.1.1 Methods
- 2.1.2 Primary Standards
- 2.1.3 Secondary Standards
- 2.1.4 Ionization Constant — ?

2.2 Purity

- 2.2.1 Radiation Purity
- 2.2.2 Chemical Purity

2.3 Technical Specification for Attestation

The representative should advise ISO that the National Bureau of Standards is the legal national agency responsible for the specification of methods of measurements, standards and attestation for radi isotopes.

James J. Byrnes
Acting Secretary

Correspondence from Herbert M. Clark, Rensselaer Polytechnic
Institute to Dr. S. Allen Lough - 3/9/59

Enclosed are two copies of the report of action taken by Group 2 of ASA Sectional Committee N5.4 at the March 4 meeting in Washington, D. C. I am sending a copy to each of the other members of Group 2, including the two who were absent, with the suggestion that they relay any corrections, additions, etc. directly to you in order to save time.

Report of Group 2 - SEALED ISOTOPIC SOURCES

ASA Sectional Committee N5.4

Use and Handling of Radioisotopes and High Energy Radiation

This report summarizes the comments on the Polish outline which were formulated at the meeting held on March 4, 1959 at the Pan American Room, Mayflower Hotel, Washington, D. C. Members of Group 2 present at the meeting were

M. Brucer
H. M. Clark
G. W. Daubenspeck
L. Eggman
A. J. Stevens

Item 3.1, Characteristics of a sealed source, was interpreted as referring to the need for a definition of the term, "sealed source." This is subject to standardization.

In studying the remainder of Section 3, emphasis was placed on the items which might actually be standardized. These are the sub-items which are given under the five types of sealed sources listed in the outline rather than the source types themselves. The latter are radiography sources, teletherapy sources, irradiation sources, therapy sources and sources for various applications. It is recognized that the importance of each item and any action taken on each would depend upon the type of source and the particular isotope.

The items and comments are as follows:

1. Source activity: normal and nominal

The method of stating the activity and the actual output, e. g., rhm is subject to standardization. Methods of calibration could be recommended.

2. Radiation source construction

This seems to be subject to limited standardization, e. g., double-wall capsule, welded seal, etc., but source construction requires consideration according to the type of source and the particular isotope for a given type.

2.1 Source dimensions

The method of specifying the source dimensions is subject to standardization.

2.2 Dimensions of the source container

It was assumed that "container" could be interpreted as "capsule". The method of capsule description is subject to standardization. To a limited extent recommendations can be made for the capsule dimensions for certain sources, e. g., teletherapy, on an isotope-to-isotope basis.

2.3 Dimensions of the source holder

There is a definite need for standardization of the definition of the terms "source", "source container", and "source holder". Without clarification of these terms it is not feasible to reach a conclusion about standardization of source holders.

3. Isodose curves of the source

This is a controversial item. A definition is needed. It is felt that isodose curves are not subject to standardization, but such curves should be prepared for every source. Methods for preparing isodose curves can probably be recommended.

4. Source marking

Source marking can definitely be standardized. Certain requirements have already been established by the U. S. Atomic Energy Commission. There are obvious problems for the case of marking very small sources.

5. Source certificate

The type and form of source certificate is subject to standardization.

Sources of existing standards are the same as those mentioned by Dr. P. Aebersold as part of the comments of Group 1.

Group 2 did not establish a priority rating for the various items deemed subject to standardization. Undoubtedly several could be standardized at this time.

H. M. Clark
March 9, 1959

Correspondence from Paul J. Mraz to Dr. S. A. Lough - 3/10/59
Re: Report of Subgroup on Unsealed Isotopic Sources for ISO/TC85/SC4/
SEC. 2/2E Agenda----Group 3

Our subgroup, meeting in Washington, D. C. on March 4, 1959, recast the subject agenda along the lines we thought more suitable for consideration at the forthcoming ISO meeting. A copy of our revised outline is attached.

We feel the order in which the subjects fall in this revised outline represents a reasonable priority listing. All the subjects or categories listed would seem subject to standardization with beneficial results.

In general the changes we have made over the subject proposed agenda are as follows:

1. All sources not sealed are considered unsealed and all are considered as one class.
2. Some words have been replaced by others more nearly reflecting our understanding of the meaning implied.
3. All subheadings originally assigned to the subject, "Labeled Compounds" have been included under a topic we name "Source Certification".
4. Medical sources have been placed more in perspective, we feel, by considering them in a broad class called "Special Considerations".

Although we had been given an additional assignment covering the topic, "Use and Handling of Radioisotopes", we have not developed any information on this subject at this time. We feel that this is a subject on which Subcommittee 5.4 can eventually write valuable standards, being, in fact, the definition of our scope of activity. It is too broad for adequate coverage in the short time available, however.

Members of our subgroups participating in this report are as follows:

G. M. Foley; J. C. Lang; S. A. Lough; W. A. Wilson; P. J. Mraz.

Sincerely, Paul J. Mraz, Member, ASA Subcommittee 5.4

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REVISED OUTLINE

4. Unsealed Isotopic Sources

4.1 General Characteristics of Unsealed Sources

- 4.1.1 Definition of Unsealed Sources
- 4.1.2 Scope of Section 4

4.2 Source Composition*

- 4.2.1 Chemical Composition
 - 4.2.1.1 Methods of determination
- 4.2.2 Isotopic Composition
 - 4.2.2.1 Methods of determination
- 4.2.3 Radiation Characteristics

4.3 Source Certification*

- 4.3.1 Specific Activity
- 4.3.2 Chemical Form
- 4.3.3 Physical Form
- 4.3.4 Compound Marking
- 4.3.5 Source Marking
- 4.3.6 Source Certificate

4.4 Special Considerations

- 4.4.1 Medical Sources for Internal Applications
- 4.4.2 Sources for Inclusion in Normal Plant Production

*Source implies unsealed radiation sources and not point of origin.

Correspondence from E. E. Beauchamp, Superintendent, Radioisotope Production Department, Isotopes Division, Oak Ridge National Laboratory to Dr. S. A. Lough -- 3/17/59

The following people comprised a group from ASA Subcommittee N5.4 concerned with the preparation of material for submission to ISO through the Polish Secretariat. The purpose of this group was to explore the possibilities of International Standards for packaging and shipping of radioisotopes:

E. E. Beauchamp	Oak Ridge National Laboratory
S. H. Brown	National Lead Company
M. M. Braidech	National Board of Fire Underwriters
T. C. George	Bureau of Explosives
T. O. Menary	E. I. Du Pont Company
P. S. Mraz	E. I. Du Pont Company
N. E. Parnell	Cities Service Company
N. A. Powell	Allison Division of General Motors

After discussion of the information that had been gathered since the last meeting, it was agreed that the following recommendations be made to the ISO for potential establishment of international standards:

1. The recommendation that ICC regulations be adopted for ground or water shipment with the omission of the details of the packaging, such as cardboard or board specifications and the omission of details of stowage for water shipment. It was felt that these details are approximately the same on a world-wide basis but that these appear in differing manners in various countries. However, the basic requirements of ICC seem to be accepted world wide and should provide a basis for international agreement.
2. For shipment by air the IATA regulations are recommended for adoption since they are the best combination of ICC regulations plus regulations for special situations that are encountered, e. g., wing tip shipments.

3. For exception shipments (those greater in amount than covered by ICC), it was recommended that the I. A. E. A. act as a coordinating agency. The I. A. E. A. would provide the necessary information as to the responsible organization in any country which must approve exception shipments. For example, an exception shipment coming to the United States would have to be approved by the Bureau of Explosives. Very truly yours, E. E. Beauchamp

P. S. I will forward the necessary copies of ICC regulations and IATA regulations as soon as I have them prepared.

Suggested Addition to The Work Outline of

ISO TECHNICAL COMMITTEE 85 - NUCLEAR ENERGY
Subcommittee 4 --- Radioisotopes

- 6. FACILITIES (IMPLEMENTATION) FOR HANDLING, PROCESSING RADIOACTIVE ISOTOPES
- 6.1. General Specifications for Work Areas
- 6.1.1. Layout of Space and Arrangements
 - 6.1.1.1. Space Requirements
 - 6.1.1.2. Segregation of Radiation Work Areas
 - 6.1.1.3. Change Rooms
 - 6.1.1.4. Lunch Room
 - 6.1.1.5. Provision for Radiation Monitoring Function
- 6.1.2. Fire Warning, Protection
- 6.1.3. Identification of Radiation Zone Work Areas
- 6.1.4. Floor Loading Specifications
- 6.1.5. Building Services
- 6.2. Detail Specifications For Facilities For Use Where High External Radiation Must Be Guarded Against

(Contamination by breathing and ingestion of radioactive material also of concern)
- 6.2.1. Surface Materials
 - 6.2.1.1. Floor Coverings
 - 6.2.1.2. Walls
 - 6.2.1.3. Benches
 - 6.2.1.4. Enclosures
- 6.2.2. Ventilation Requirements
- 6.2.3. Waste Disposal Provisions

- 6. 2. 3. 1. Liquids
- 6. 2. 3. 2. Solids

- 6. 2. 4. Shielding

- 6. 2. 4. 1. Guides for Calculating
- 6. 2. 4. 2. Material and Specifications
- 6. 2. 4. 3. Viewing Windows

- 6. 2. 5. Criticality Protection Specification

- 6. 2. 6. Functional Equipment

- 6. 2. 6. 1. Multicurie Cells
- 6. 2. 6. 2. Junior Caves
- 6. 2. 6. 3. Safety and Fire
- 6. 2. 6. 4. Personnel Decontamination
- 6. 2. 6. 5. Equipment Decontamination
- 6. 2. 6. 6. Storage of Isotopes

- 6. 3. Detail Specification For Facilities For Use Where
Contamination By Breathing and Ingestion of
Radioactive Material Must Be Guarded Against.

- (External radiation problems of minor concern.)

- 6. 3. 1. Surface Materials (See also 6. 2. 1 and sub topics)

- 6. 3. 2. Ventilation Requirements

- 6. 3. 3. Waste Disposal Provisions

- 6. 3. 4. Criticality Protection Specifications

- 6. 3. 5. Functional Equipment

- 6. 3. 5. 1. Hoods
- 6. 3. 5. 2. Glove Boxes
- 6. 3. 5. 3. Safety and Fire
- 6. 3. 5. 4. Personnel Decontamination (See also 6. 2. 6. 4.)
- 6. 3. 5. 5. Equipment Decontamination (See also 6. 2. 6. 5.)
- 6. 3. 5. 6. Storage of Isotopes