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Regulatory Responsibility in the Atomic Energy Program

(A Symposium)

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Dr. Aebersold (Viewpoint of Federal Government)

THE REGULATORY ACTIONS taken by federal, state and local governments will exert a great impact on the present and future development of the civilian atomic energy program. All are aware of the tremendous potential that atomic energy holds for mankind. All are equally aware, on the negative side, of the potential radiation hazards associated with the use of radiation and radioactive materials. These hazards must be controlled so that the full realization of atomic energy benefits may be enjoyed.

Radiation is not new with atomic energy. Since its inception, life has been subjected to natural sources of radiation. Man-made radiation has been present for over 60 years. Prior to the advent of atomic energy, considerable knowledge and experience had been acquired in dealing with radiation. Through early experiences with radium and X-rays, the harmful effects of radiation on the body were recognized. Permissible radiation exposure levels and protection methods were established primarily through the continuing study and recommendations of the International and National Committee on Radiation Protection. Atomic energy, however, introduced radiation problems far beyond anything man had previously dealt with.

Extensive research on the hazards of radiation to man permitted reliable protective measures to be instituted. The comprehensive and conservative health and safety control measures

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[*Editor's Note:* This is the substance of a symposium recently held at the annual meeting of the Society of Nuclear Medicine in Oklahoma City, Okla. Dr. Maxfield's remarks are omitted.]

established in atomic energy installations during the past 15 years have resulted in an outstanding safety record. There is still much to be learned. A continuing study of the factors relating to radiation protection by the Atomic Energy Commission (AEC), the National Committee for Radiation Protection (NCRP), and other interested groups is essential.

The Atomic Energy Act of 1954 opened the door to widespread civilian participation in atomic energy, and placed on the Atomic Energy Commission the responsibility of governing the civilian atomic energy program through a comprehensive system of licensing, regulations and inspection. It thus became necessary to translate our knowledge and experience with radiation hazards into a practical, adequate set of rules which assure protection of atomic workers and the public and yet not hinder the development of peaceful atomic energy uses.

Eight basic licensing regulations including radiation protection standards have been issued by the Commission and are in force. They have been published in the Federal Register as part of the Code of Federal Regulations. These include regulations governing the licensing of nuclear facilities and operators of these facilities, by-products material (radioisotopes) and source and special nuclear materials. This licensing might be termed the Commission's preventive medicine program. The applicant's proposal is given a "hazards" evaluation covering his responsibility, competence, equipment, facilities and administrative procedures for assuring safe use of the nuclear materials. If it is found from this evaluation that the applicant's proposal is well calculated to assure radiation protection, a license is issued. The licensee may also be subject to special terms and conditions incorporated in his license, to accommodate particular circumstances not specifically provided for in the regulations.

All licensees are obligated to abide by certain regulatory requirements in the use of nuclear materials. This brings us to the Commission's radiation safety regulations *Standards for Protection Against Radiation* which might be called "Rules for Good Radiation Health." The regulation sets down maximum limits for exposure of individuals to radiation, maximum concentration values for discharge of radioactivity into the environment, and limits for radioactive waste disposal. In addition to the technical levels on radiation and radioactivity the regulation establishes certain administrative and operational requirements, such as record keeping, personnel monitoring, posting of radia-

tion areas to indicate the presence of radioactivity, radiation surveying and reporting of overexposures, accidents or incidents. This regulation was based on the permissible exposure levels developed by the National Committee on Radiation Protection, the procedures and practices developed in the Atomic Energy Commission's installations, and the experiences of over 10 years of reactor radioisotope distribution to private medical, industrial, and research institutions. The basic technical levels imposed by these rules are in essential agreement with those recommended by the National Committee on Radiation Protection. The benefit of advice and assistance was had from the Advisory Committee of State Officials, various state groups and other interested parties in developing these regulations.

The NCRP has recently made recommendations to limit cumulative exposures over periods of years. The Commission is giving careful consideration to appropriate amendments to its regulations to deal with the cumulative exposure problems and are working closely with the states in the development of all regulations and in the administration of the licensing program. Now that the *Standards for Protection Against Radiation* are effective it is hoped that as the states decide to regulate in this area, they will use the standards adopted as a working model. This will achieve a pattern of consistency between the states and Federal Government in the administration of radiation protection controls.

As in any health and safety program there remains one final requirement—*Periodic Checkups*. Under the federal atomic energy control program, this is carried out through the Commission's Division of Inspection. Licensees are periodically inspected to determine whether they are complying with the conditions of their license and the federal regulations.

All licensees, therefore, have special legal and administrative requirements. Failure to comply with applicable statutory or regulatory requirements may result in recall of nuclear material from the licensee, withholding of future materials, or an injunction prohibiting further violations. Willful violations may be punished by fine, imprisonment, or both.

In summary, standards of performance and operating practice are imposed. Individuals and facilities are licensed in an effort to assure that nuclear materials will be used safely. Compliance with the Commission's regulations in the operation of nuclear plants and use of nuclear materials will assure that in-

dividual employees and the public will not be injured by radiation, while at the same time permitting a vigorous and beneficial atomic energy development.

Mr. Norton (Viewpoint of State Government)

As yet, lawyers have not generated great interest in the subject of radiation hazard. Possibly the lawyers do not yet realize that there will be something like atomic ambulance chasing. Those who have the ability to look into the future can visualize the tremendous problems that will be created in the so called atomic age. These problems should be met now.

The 1954 Atomic Energy Act has opened the gates and has invited the states to participate in accepting responsibilities and to determine what action should be taken. The Joint Committee on Atomic Energy is also concerned about the division of functions and responsibilities. It has called on the states to tell the Congress what the states will ultimately want to regulate and control. The Joint Committee admonished the states not to abdicate the field of atomic energy regulation to federal agencies, nor to abandon the historical and constitutional regulatory functions for such reasons as: the novelty of the atom, or the lack of trained personnel. It further called upon the states to take an active interest in regulation of this new industry.

This should have been sufficient for the states to go ahead and start their activities. Some of the states are actually working on this. The Texas Committee on Atomic Energy, appointed by Governor Shivers, was the first one to pass some regulations and to shape policy. Some of these policy recommendations dealt with the following: first, to set up a citizens' state advisory committee on atomic energy permitting this subject to be kept out of politics. The second recommendation suggested that the Co-ordinator refrain from setting up a new operating department interfering with existing departments and becoming a little empire. We also recommended that existing state departments and agencies should be utilized in the regulation and control of atomic energy. By the addition of some new people, or the training of qualified personnel, this existing state unit could discharge its responsibilities at a minimum cost to the state.

Also recommended was uniform legislation by administrative rules or codes, rather than by statute. It is far simpler to change a technical administrative rule or code on the state level,

than to try to change a statute and face the political implications of a minor technical change.

The Texas Committee has gone beyond the borders of the state and participated in the efforts of the Southern Governors Conference, comprising 16 southern states. By lending leadership it was able to convince the sixteen state groups to adopt its recommendations without any major change. The Texas Committee also participated in the atomic deliberations of the 48 state Council of State Governments. At this meeting an agreement was reached based on the committee's policy recommendations. These recommendations have, therefore, become the ground rules for all the states.

Furnishing of tools in augmentation of policy is a major job yet to be accomplished. For that purpose, a draft act, prepared by the Texas State Bar Association, expresses the intent to ultimately accept state responsibilities. The states, under the constitutional division of power, must accept their responsibilities and governmental functions. Unless the states take action the federal agency, possibly against its own will and that of the Joint Committee, will either volunteer or be made to accept these functions. The Texas Committee has taken action in a concrete manner by persuading the Southwestern Legal Foundation, located in Dallas, Texas, to engage in surveys and research. Especially important is the feasibility of adopting a compact (which amounts to voluntary cooperation between the states), similar to such compacts as the Interstate Oil Compact. This has done much to keep the oil industry out of government control.

This feasibility study will determine if a compact (which is a well known and proven governmental device of the states), will work equally well in regard to atomic state control and whether it will provide the states with the means of adopting uniform laws. It would be necessary to know if present state laws permit, or are duplicated by the adoption of enabling legislation in regard to this compact. This research might disclose some other device adaptable to the needs of the states.

This should indicate that the lawyers are planning ahead. They have been of assistance to state committees and state legislators as well as to Governors who are realizing that their stake in the atomic age is an important one. Progress, however, is not to be in haste, because hasty legislation may be more harmful than helpful. With a fairly clear road ahead approved by the

states the important knowledge gained will help the state legislators and the Governors to plan intelligently. Admittedly, the task assigned is not one to be taken lightly. Those familiar with our constitutional system of government must lead this effort, otherwise, it most certainly will fall into the most unqualified hands.

From the technical standpoint, we need and request the assistance of doctors, of industry and of scientists in the atomic field. We don't want to set the standards. We will leave that to national bodies. However we will assure the national bodies that such standards, as suggested by them, will be enforced through existing state bodies.

Finally, I am old fashioned enough to believe in the Constitution of the United States. I believe that it is a working and workable document. It can be made to apply to the atomic age, or any other age for that matter, just as it has been applied to the age of the pioneer, to the air age, and the motor age. To believe, that we will get constitutional government by accident or automatically is foolhardy indeed.

Lawyers, doctors, administrators and scientists, will help with the task before us. But let us not look for new devices or new methods of government, or control, until we are satisfied that we have tried to the best of our ability those given to us through the Constitution.

Admiral W. A. Kitts (Viewpoint of Industry)

Industry speaks authoritatively through its Trade and Industrial Associations. There is no body representing the Atomic Industry as such. There is an industrial association, the National Association of Manufacturers (NAM)—the makers of things, all kinds of things, of this country. Manufacturers and users of nuclear equipment are a small part of its vast membership. The NAM has issued an authoritative declaration of policy on *Nuclear Hazards*. It is only when quoting this declaration of policy that I may be considered as a spokesman for industry.

I hope that I may be considered as an interpreter of the consensus of all the many participants in the Atomic Industry. "Industry" is used in the broadest sense of the term here. The Atomic Industrial Forum is the great meeting place, assembly for open discussion, and information center of all the diverse interests affected by the peaceful applications of atomic energy.

The Forum takes no stand, promulgates no policy, grinds no axe. It is a forum. I speak as a participating member.

Industry makes all and uses most of the large nuclear equipment. Industry is on the receiving end so far as laws and regulations are concerned—and much more so than the ordinary citizen is in respect to ordinary laws.

The laws and regulations are devised, drawn up and passed by legislative bodies, national, state or municipal. These are turned over for execution to executive bodies, the AEC, the State and Municipal Health Departments, the State and Municipal Labor Boards, and in some parts of the nation to a variety of other regulatory bodies. These laws and regulations are enforced by human beings. "Qualified experts" is a term which is cropping up all over the country in the body of these laws. These laws and regulations are obeyed by Industry. It is an interesting thought that the laws and regulations are for the protection of people, the public or workers in the field, but that disobedience of the law by the individual results in the payment of damages by Industry.

Here is Industry's position: (1) The owners raise the capital to build a nuclear installation; (2) the managers build, design and operate the installation; (3) they insure through an atomic insurance group; (4) they are responsible for providing the protection under the law against the hazards to which they themselves and their employees, professional and labor, and the public are subjected. If anything goes wrong the owners pay the piper.

What is Industry's course under these circumstances? To obey the laws and regulations. What Industry is not going to do is to pass laws and regulations or execute them. That is not within its province. Nor does Industry desire to participate in any Federal vs. State controversy. Industry, along with legislators, executive bodies, the learned professions, insurance and banking *and* the public, have one great interest in common: the passage of fair, equitable and workable laws and regulations.

This common goal may be achieved through standards, and this is the road Industry is taking. It is on this subject that Industry has issued an authoritative declaration of policy. The NAM 1957 issue of *Industry Believes*, on the subject of "Regulatory Protection from Nuclear Hazards," says:

"There are unique health and safety hazards in any nuclear energy program. At present general standards are not available

as a guide for protection of life and property from those hazards. If industry is to utilize its full potential in development of peaceful uses of atomic energy, regulations pertaining to the control of such hazards, applicable to all nuclear energy operations should be promulgated without delay.

“Historically, regulations concerning industrial health and safety have been the responsibility of the individual states and not the Federal Government. Many of these state regulations have been adopted through the development of a comprehensive set of American Safety Standards under the procedures of the American Standards Association. A set of control standards in the field of nuclear energy should also be developed in the same manner by the American Standards Association. The AEC, the state health and labor departments, producers, users and employees, insurance and other groups having a substantial interest in these problems should cooperate with the ASA in the development of regulations satisfactory to all which can be adopted uniformly by the AEC and state and local regulatory groups. Uncoordinated regulations in the nuclear energy field would tend to bring about an untenable and chaotic situation.”

Two intermediate exploratory steps must be taken: a consideration of Industry's conviction that standardization is the right road, and an explanation of the role of the third great organization in the atomic energy effort. The first requires us to define our terms. Perhaps at the expense of over-simplification it is submitted that laws and regulations are imposed and obedience to them is enforced. Standards and codes on the other hand are not imposed. Written or unwritten, they are accepted by those who have a need to use them. The basis of acceptance is a consensus of the users. Nevertheless, once established their use is entirely voluntary. The relation between standards and laws is that good, workable and enforceable laws and regulations are based on good and voluntarily accepted standards. Industry is persuaded that good voluntarily accepted standards may be arrived at in the nuclear field and that good laws and regulations will result therefrom.

Our second step is to consider the mechanism whereby good and voluntary standards may be arrived at—to become the basis of these good and workable laws. The American Standards Association is not a trade, industrial, professional or scientific association in the generally accepted meaning of the word. It is an association of such associations, upon whose Board of Di-

rectors each sponsoring association is represented. The Association represents the whole gamut of our economy including Labor and Federal and State Government. The ASA is a clearinghouse providing the machinery by which standards—which the ASA itself does not devise or originate—may be certified as “American Standard.” The standard is submitted for certification, and the criterion is a consensus of all those substantially interested in the particular standard, that it is worthy of such certification.

Standardization in a particular field is under the supervision of a Standards Board. It assigns projects in the field and determines, when a standard is submitted, that a consensus actually exists.

The actual work of drawing up a standard, submitting it for certification, and the responsibility for obtaining a vote to determine a consensus, are performed by a technical committee known as a sectional committee. The sectional committee actually executes a “project” under the administrative responsibility of a sponsor (in some cases with one or more co-sponsors), which is one of the associations. The membership of the sectional committee is made up of all interested associations, not all of which need be member bodies of ASA.⁶

⁶ A Nuclear Standards Board, representing 33 interested associations, has been formed and six “projects” have been established to be executed by “sectional committees” under the following sponsors:

- N2 General and Administrative Standards for Nuclear Energy—Atomic Industrial Forum.
Nomenclature; Color Codes; Symbols; Qualifications of Professionals; Accountability, Records and Reporting Procedures.
- N3 Nuclear Instruments—National Bureau of Standards, specifications and methods of testing for instruments used in the nuclear field including instruments for personnel protection, reactor control, industrial processes, analysis and laboratory work, radiation calibration equipment and components thereafter.
- N4 Electrical Requirements for Reactors and Nuclear Power Systems and Generation and Application of Nuclear Radiation—American Institute of Electrical Engineers, Electric Light and Power Group, and National Electrical Manufacturers Association.
Standards, specifications and methods of testing for the electrical equipment used in nuclear reactors and nuclear power systems and in the generation and application of nuclear radiation.
- N5 Chemical Engineering for the Nuclear Field—American Institute of Chemical Engineers.
Standards, specifications and methods of testing in the field of chemical engineering in the nuclear field including fuel processing, separation and reprocessing and purification of materials, treatment of foods, production of tagged pharmaceuticals, separation of radioisotopes, handling and treatment of radioactive gases, liquids and solids, chemical resistant coatings, cleaning facilities, decontamination of equipment, etc.

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I should judge that the Society of Nuclear Medicine would be particularly interested in the missions of Sectional Committees N2 and N7. Since I am a member of the sponsoring organization in each case, the AIF, and am consequently more familiar with these two projects, I shall use them as examples of Industry's efforts.

These Committees are now being organized, invitations for membership representation are now being issued—requests for membership will always be welcomed—and the chairmen and secretaries are already working on assignments in their approved scopes. One nuclear standard has been certified "American Standard," the *Glossary of Nuclear Terms*, submitted as a non-sectional committee project, N1, and presently under revision in Sectional Committee N2. This first "American Standard" will be presented to the International Technical Committee on Nuclear Standards, this summer in Geneva, as the basis of what will be a multilingual *International Glossary of Nuclear Terms*.

Keeping in mind the scopes of N2 and N7, an examination of the associations, which are being invited to provide working membership, will demonstrate the attempt on the sponsor's part to provide full representation from all in drawing up the assigned standards and insuring a consensus as to their validity.⁷

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N6 Reactor Hazards—American Nuclear Society and American Society of Mechanical Engineers.

Codes and standards, concerned with the hazards involved in the design, location, construction, and operation of nuclear reactors and of potential critical assemblies.

N6 Radiation Protection—Atomic Industrial Forum and National Safety Council.

Safety standards for the protection of persons employed in facilities associated with the production and utilization of fissionable materials against the normal, routine hazards present in such facilities (facilities include mines, mills, refineries, separation plants, fuel element fabrication plants, critical assembly facilities, processing and re-processing plants, working areas around nuclear reactors of all types, and transportation, and purification of "spent fuel elements" and gross fission products).

⁷ N2—General and Administrative Standards

Atomic Industrial Forum—Sponsor

American Nuclear Society

American Society of Mechanical Engineers

Atomic Energy Commission

National Bureau of Standards

National Safety Council

U. S. Department of Defense

American Institute of Electrical Engineers

National Committee on Radiation Protection

American Medical Association

American College of Radiology

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These are examples of the working groups which are to give us our nuclear standards. All sponsors, and those of these two projects in particular, will welcome suggestions for expanding these committees and volunteers to serve them. The basic concept is the consensus. All who conceivably have an interest should participate. Industry is determined to follow the clear road ahead—good standards leading to good regulations for the protection of all.

Dr. Thoma (Viewpoint of the Medical Profession)

Medical efforts in this problem are directed to the protection of the people against radiation hazards and physical harm. This of course, is preventive medicine. In this respect, everyone will look to the medical profession for guidance. We need regulations of some sort. It is immaterial to medicine whether this is to be regulated by the federal or state governments. We can see that much is being done on the mechanics of grinding out various pieces of paper to bring this about.

The medical profession must guide and give advice to the regulatory agencies, to industry and to our own profession. Those assembled in this group must be presumed to have an understanding of the problem. We certainly need to know much more. Perhaps the medical people here may be aware of the general inadequacies of the rest of the medical profession regarding this new field of medicine. This is not said with a note of discouragement. It exists because physicians haven't been trained.

Many of us knew little about radiation hazards until we

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American Bar Association
 Health Physics Society
 National Science Foundation
 American Public Health Association
 Conference of State and Provincial Health Officers
 N7—Radiation Protection Standards
 Atomic Industrial Forum—Co-sponsor
 National Safety Council—Co-sponsor
 American Industrial Hygiene Association
 American Society of Safety Engineers
 Association of Casualty and Surety Companies
 Atomic Energy Commission
 Conference of State and Provincial Health Officers
 International Association of Government Labor Officials
 AFL-CIO
 Health Physics Society
 National Bureau of Standards
 National Association of Mutual Casualty Companies

became interested in a particular phase of the problem. A good pathologist in the city of St. Louis called asking whether it would be safe for him to do an autopsy on a body contaminated by Cobalt 60 teletherapy treatments. This single question points up the glaring deficiency of the medical profession in education concerning radiation hazards. This physician is not stupid. He just has not been exposed to this information.

Even the men now being graduated from medical schools have very little, if any, knowledge of radiation hazards. We therefore, have the obligation to disseminate known facts on irradiation. All physicians must be trained in radiation hazards in the medical schools, through the county medical societies, and through the hospital staffs. Even one-hour discussions on the practical terms of radiobiology will help with this knowledge, so that the physician will appreciate the hazards. A man who asks if he can autopsy a body contaminated by Cobalt 60 (an external source) just does not understand the rudimentary concepts of gamma irradiation. Much of this misunderstanding can be dispelled and corrected in an hour's staff meeting.

This is the important role for us to play. The profession needs to train its members in protective practices. Such training should not be in the minute details of physics, but simply to explain that it is better to get farther away and to take a longer time to do the job than to get too close and run the risk of radiation hazard. The significance of the inverse square law is probably something most physicians just do not understand. But this is a fundamental basic concept that all doctors should know. We can compare it to our training in public health and preventive medicine in medical school. Most medical students find it difficult to stay awake in public health lectures. Medical students are just not interested in public health at that stage of their training. Nevertheless, certain basic principles seep into the subconscious. Later, when asked by patients just what steps are necessary in order to prevent disease after a flash flood, these basic principles are recalled. Because of contaminated wells, the patient must be immunized against typhoid. The well should be chlorinized. And so on. The physician may not know how much chlorine to put in the well, but the basic concept of public health is there.

The same must be done with respect to radiation hazards.
This is medicine's important role in radiation hazard.