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MINUTES

137th MEETING

ADVISORY COMMITTEE FOR BIOLOGY AND MEDICINE
U. S. ATOMIC ENERGY COMMISSION

January 8, 1971 - AEC HQ.
January 9, 1971 - "H" St. Ofc.

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1071770

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- 2 -

The 137th meeting of the Advisory Committee for Biology and Medicine was held January 8-9, 1971, at AEC HQ, Germantown, Maryland, and the AEC "H" Street Office. All ACBM members were present although Drs. Finch and Schull were late in arriving because of travel difficulties. Dr. J. B. Storer, Scientific Secretary, and Miss Rosemary Elmo, Executive Secretary, were also in attendance. Dr. John Totter, Director, Division of Biology and Medicine, and a large number of the DBM staff were present. Commissioner Larson was present for a portion of the meeting as was Dr. S. G. English, Assistant General Manager for Research and Development. Dr. Martin Biles, Director, Division of Operational Safety and a number of his staff were present for a portion of the meeting. Chairman Moseley called the meeting to order at 9:00 A.M. on January 8 and called on Dr. Totter for any announcements of general interest. Dr. Totter welcomed to the meeting representatives from the Environmental Protection Agency, namely Drs. Lieberman, Wolff, Mills, and Tompkins.

Staff changes in the Division of Biology and Medicine include the following: Mr. Loviece Brazley has joined the Program Coordination Branch; Dr. T. Beasley has joined the Environmental Sciences Branch; Dr. Norbert Page has left the Biology Branch; Dr. Joseph Goldstein is recovering satisfactorily from a recent coronary occlusion.

Dr. Totter pointed out that Dr. Ernest Sternglass of the University of Pittsburgh has resurfaced in his attacks on radiation after being relatively quiet for several months. A considerable amount of staff time was spent in rebutting charges by Sternglass that the Dresden reactor in Illinois has been responsible for increased infant mortality.

The American Association for the Advancement of Science has appointed a committee to look into the responsibilities of scientists as well as their relationship to various federal agencies. The composition of this committee is not known and it is not clear how rapidly they will go about their task.

The Division of Biology and Medicine is presently involved in planning for a White House Conference on Aging. In addition, DBM is working closely with Dr. Berger of the President's Science Advisory Committee on a report on the effects of various environmental agents on health.

Dr. Totter then introduced Dr. Thomas Mancuso from the University of Pittsburgh who reported on the status of the health and mortality studies which involve AEC installations. Dr. Mancuso reported that the study began in 1964 as a feasibility study. Basically the approach is to tabulate radiation exposures received by various contractor employees as estimated by film badge readings, match these employees with control groups, and then use the social security system for a follow-up on what has happened to these employees. The system uses death certificates to ascertain causes of death. The population base amounts to approximately 175,000 people and the control population is about twice as large since there are two matched controls for

1071771

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- 3 -

every member of the study group. The study is complicated by including records of exposure to toxins other than radiation; for example, solvents of various types. Dr. Mancuso now expects to have some sort of analysis completed by next summer for the Hanford employees. Dr. Moseley pointed out that because of the excellent AEC safety record and good health care for the employees of the prime contractors, it may turn out that the AEC employees will have a better mortality experience than that found in other industries. Dr. Mancuso argued that because some of the employees received little or no exposure, these could be compared with those employees who received some measurable exposure. Dr. Moseley further pointed out that exposure is a very unreliable estimate of radiation dose and that death certificates are perhaps a dubious method of ascertainment of causes of death. Dr. Mancuso replied that the death certificates are probably equally bad for both controls and the study population and further he had no alternative to using exposure since there was no way to establish radiation dose. Commissioner Larson pointed out a potentially complicating factor in the study in that because of the health programs at the National Laboratories the employees are x-rayed periodically. Dr. Sanders, who accompanied Dr. Mancuso for the presentation, said that studies at Hanford showed that medical x-rays accounted for about 1/3 - 1/6 of the occupational exposure. He felt that because the taking of x-rays was random this was not a particularly complicating factor. Dr. Haagen-Smit wanted to know when the results would be in. He didn't get a definitive answer. Dr. Cohen felt that Dr. Mancuso and his colleagues were collecting data at a very great rate but he was uncertain as to what the data meant. Dr. Cohen's position was that a feasibility study should establish whether correlations have any meaning. Dr. Mancuso asserted that the data did have meaning. Dr. Cohen was apparently not satisfied with this answer and wanted to know whether they had investigated whether death certificates had the information required. This would properly be part of a feasibility study. In essence, Dr. Cohen was trying to get a statement of the hypothesis under test. He didn't succeed.

Dr. Laughlin pointed out that in the case of diagnostic exposures to x-ray, most of the dose would have been received by a few people. The average dose might be 1/3 of their occupational exposure but in those who actually received x-rays, it would probably be considerably greater than the occupational exposure.* The subject was left at this point and Dr. Totter introduced Dr. Lieberman, from the Environmental Protection Agency. Dr. Lieberman proceeded to describe the new agency. It was established on December 2, 1970, as an independent agency comparable, for example, to the AEC. Mr. Ruckelshaus, a lawyer, is the director of the Agency. EPA will consolidate from a number of other agencies a wide variety of activities. It will take in most of the studies on pesticides. It has taken over the Federal Radiation Council, a small group from the regulatory side of the AEC, and a portion of the Bureau of Radiological Health. Dr. Lieberman is acting commissioner of the Radiation Office of EPA. EPA has as yet no new authorities or functions but has simply been assigned existing authorities by transfer from other agencies.

*Dr. Laughlin also asked how they arrived at the dosage values for diagnostic radiation. The reply was that they estimated the dose to the volume irradiated and divided by the total weight of the person to obtain an average dose.

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1071772

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- 4 -

The operating sections currently planned for the Radiation Office are:

- 1) Division of Criteria and Standards, headed by Dr. Paul Tompkins
- 2) Surveillance and Inspection Division, headed by Mr. Weaver
- 3) Research Division, headed by Dr. William Mills
- 4) Technology Assessment Division, headed by Dr. David Harwood

With respect to its radiation responsibilities, the EPA is responsible for settling standards "outside the fence" of AEC licensed operations. The emission standards still belong to the AEC.

As an aside, it is interesting to note that EPA will also be responsible for the problem of noise pollution.

The annual budget will be somewhere around 1.4 billion dollars but of this about 1 billion will be used for construction grants. It is anticipated that EPA will employ about 6000 people.

The National Academy of Sciences study on the technical basis for radiation standards which was initiated by the Federal Radiation Council will now be supported by EPA.

Presumably in part because of the confusion occasioned by the reorganization, the problem of setting standards for the uranium miners has now been extended for six months.

Of the 6000 or so people in EPA about 400-450 will be in the radiation office. The Southwest Radiological Laboratory and the Southeast Radiological Laboratory, which were formerly operated by the Public Health Service, are now part of EPA. Curiously, the Northeast Radiological Laboratory remains with the Bureau of Radiological Health.

Dr. Stout asked about responsibilities for radioactive waste disposal. Dr. Lieberman replied that this problem stays with the AEC. Dr. Moseley was curious about the activities of the Research Branch of the Radiation Office. Dr. Lieberman indicated it would be small and they would necessarily have to rely on DBM for much of their information.

Dr. Lieberman also reported that the Holifield Bill has been modified, taking out much of the heavy reliance on the NCRP for establishing radiation standards.

Dr. William Doran from the Division of Operational Safety reported to the ACBM on a proposal received from the Lawrence Radiation Laboratory, which was designed to correlate the inhalation toxicity of certain organic compounds in five human volunteers with the results obtained in experimental animals. Dr. Cohen took a very dim view of this proposal. The toxic agents were liver

1071773

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- 5 -

toxins and it did not seem justified to use human subjects.

Mr. Robert Catlin reported on a study done by an ad hoc group on potential requirements for regional centers for taking care of radiation accident victims. This problem, of course, has been under discussion for a long time and there are those in industry who argue that the AEC should set up and man such centers. Mr. Catlin indicated that it was the Division of Operational Safety's position that they should compile a list of people competent and interested in taking care of such patients. These lists would be freely available to industry. He felt that licensees and contractors should assume responsibility for facilities and planning for treatments.

A brief executive session of the ACBM was then held to determine the agenda for discussions with the Commissioners.

The ACBM then met with Commissioners Ramey, Larson, and Johnson, with Assistant General Manager Bloch also present.

Dr. Moseley reported on the ACBM's findings with respect to its investigation of human experimentation, as requested by Commissioner Johnson. This had to do with the irradiation of the testes of prisoners in Washington and Oregon. The Committee found that the human rights of the individuals were protected and that a useful and worthwhile hypothesis was tested.

Dr. Stout discussed his intense interest in the stable isotopes being produced at the Los Alamos Scientific Laboratory. He reported that by a relatively modest modification of the procedure the Los Alamos group could isolate isotopes of nitrogen, oxygen, and sulfur. If the cost for nitrogen isotopes could be reduced as much as they were for carbon-13, then pounds of the material would be used where grams are presently used. He urged the Commission to active consideration to implementing a separations program for these isotopes. Commissioner Larson expressed his interest in this proposal. Dr. Moseley emphasized the use of these stable isotopes in environmental studies and Dr. Cohen pointed out that they would be useful in medicine as tracers in man. Dr. Stout said that there was the additional advantage that the depleted nitrogen-14, which is the abundant isotope, would be useful in very large scale agricultural experiments; since the nitrogen-15, which is normally present, would be absent, the nitrogen-14 itself would become suitable as a tracer.

Mr. Ramey asked about the value of making comparative studies on the biological hazards of generating power by various alternative methods. Dr. Totter wondered if the AEC could legally undertake such studies and Mr. Ramey felt that it could. He indicated that some preliminary looking at the problem had been done within the Commission on the relative risks of coal mining and uranium mining per unit of power production. Dr. Cohen replied that if the Commission would double the DBM budget they would get a lot of this information on other pollutants and probably up to five times

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1071774

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- 6 -

as much good information as they are now getting.

Dr. Haagen-Smit discussed the problem of oxides of nitrogen from fossil plants in the context of Mr. Ramey's question.

Commissioner Johnson then raised the question of whether there are beneficial and commercially useful mutations which can be produced by exposures to radiation. This led to a general discussion of the problem and Dr. Totter pointed out that in the current Scientific American there is a feature article concerning this question. Much of the revolution in agriculture has been brought about through the use of mutant plants. Many of these have been induced by radiation.

There was then a rather general discussion of the increasing cost of energy production. Dr. Haagen-Smit wanted to know why it takes so long to build a nuclear power plant and Mr. Ramey explained the whole complexity of the problem. Increasingly the delays have been due to interveners in the licensing procedures.

In the afternoon session Dr. S. G. English discussed the use of AEC laboratories in the conduct of research for other agencies. Legislative authority exists for performing such work. The legislative authority is as follows: Section 31 of the Atomic Energy Act as amended has, in general, been broadly interpreted. This Section of the Act is used in cases where research is of joint interest both to the AEC and the other agency. An example of this type of collaborative work would be the carcinogenesis program at the Oak Ridge National Laboratory. Section 33 of the Atomic Energy Act specifically authorizes the AEC to do work for others where it is health and safety related. Before this is done, however, a determination has to be made that private laboratories are inadequate for the purpose. The final legislative authority comes from the Economy Act of 1932 which authorizes one government agency to work for another, an arrangement which seems eminently reasonable.

AEC's policy with respect to work for others is to encourage it if the work is important and if the laboratories have the necessary competence. Such work for others must not, however, interfere with the AEC's own mission. Generally the AEC regards its laboratories as National Resources.

With respect to making arrangements for doing such research, it is perfectly proper for contacts to be made at the technical level between the laboratories and other agencies but the formal proposals must clear through headquarters of the AEC. The funding does not go directly to the laboratories but comes to the AEC by an interagency transfer of funds. Of the various AEC laboratories the Oak Ridge National Laboratory presently does the most work for others. At present ORNL does 13 million dollars' worth of work for others and 85 million dollars worth of work for the AEC. Dr. English sees no particular problem with this arrangement. At the present time the total work done for others within the entire AEC, exclusive of weapons production,

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1071775

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- 7 -

is 19 million dollars. Of this, 12 million is related to health or environmental studies.

Dr. English pointed out that the AEC was criticized last spring by the Joint Committee on Atomic Energy for going too far afield in its work for others and now the proposals have to be watched very carefully.

Mr. Eason then requested advice from the Advisory Committee as to how long exposure records on contractor employees should be maintained. The AEC policy at present is for an indefinite maintenance of radiation exposure records. Mr. Eason indicated that in cases where states have jurisdiction there is extreme variation in the policies. Recommendations from various expert committees were also very variable with respect to how long the record should be kept. Some people think they should not be kept at all. For example, Dr. Raventos, speaking for the American College of Radiology, says they are worthless. Additional societies are being polled at the present time; for example, the American Medical Association, Health Physics Society, and various legal societies. Mr. Eason asked the ACBM specifically for advice on whether and for how long records should be kept. Dr. Laughlin wanted to know how often film badge records had been useful in court. Mr. Eason indicated that in some cases they have been important. Dr. Haagen-Smit was curious to know why some people felt the records were worthless. Dr. Moseley indicated that the badge reading may have no relation to the dose received by the individual. Film badges are useful in monitoring radiation practices but not for establishing dose. In order to comply with the so-called N-18 rule there is a requirement that the records be kept. Mr. Eason felt that negative exposure records might be extremely important to an employer. In order to answer Mr. Eason's question, Dr. Moseley indicated that exposure records should be kept for legal reasons for whatever period is necessary. This is a legal, not a scientific, question. Such records are of extremely limited usefulness for epidemiological or scientific studies.

Dr. Biles, Operational Safety, reported on the status of the surveys being conducted in Grand Junction, Colorado. The role of the Public Health Service has been transferred to EPA. A decision was made to monitor houses for gamma ray levels only but not for radon. The radon readings are too variable and too complicated for a routine use. In Grand Junction 3,678 locations have now been monitored. In cases where levels in excess of 0.02 mr/hr were found the houses were thoroughly monitored with 30-50 additional individual readings. Nineteen hundred and eighty-three showed the presence of mine tailings either under the house or in close proximity. Sixteen hundred and ninety-five houses were completely free from evidence of mine tailings in the immediate vicinity. It now appears that perhaps 15 percent of the houses in Grand Junction will exceed the action levels specified by the Surgeon General. There is now increasing pressure to monitor all the houses in the city and perhaps even all the houses in the county. It is still not clear what actions will be taken in the case of houses whose radiation level exceeds that specified by the Surgeon General.

1071776

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Dr. Richmond, of the DBM staff, reported on the status of the various interagency review groups concerned with the problem of hazards to uranium miners.

Dr. Barr reported for the group on instrumentation development for measuring radon. At present none of the personnel monitors are useful. The instant working level meter, however, is apparently very successful. The group charged with looking at the economics of changing standards is about finished. Apparently the cost in terms of increased cost of power generation may not be terribly substantial if the levels are lowered.

Dr. Gross described the high altitude sampling program of DBM and indicated ways in which they propose to modify it. The balloon sampling program now costs \$700,000 a year. It is proposed to ask the Air Force to change its support group to Holloman Air Force Base at a net savings to the government. It is proposed to continue the quarterly balloon sampling program conducted from Australia. Dr. Engelmann, Chief of the Fallout Studies Branch, DBM, proposes an annual sampling by balloons in the northern hemisphere. He raised the question of how well the AEC needs to know the inventories of fallout in the stratosphere and how accurately it needs to be able to predict future dose commitments to man. These responsibilities are apparently in the AEC largely by default. There was a general discussion of the problem but no specific recommendations were made.

Dr. Still, of the Medical Branch, DBM, described the status of studies of trace metals in man based on autopsy samples. This program has been going on since 1950 in Los Alamos on a small scale. The program has now been expanded in collaboration with pathologists in the Denver area. Among other things, the Los Alamos people are measuring mercury, lead, plutonium, americium, cadmium, and many other metals.

Dr. Still also reported on a proposed DBM-supported study to look at a population of former tuberculous patients in North Carolina. The group includes people who were in hospitals in the period 1930-1950. Many of these patients had weekly fluoroscopies and many are still alive. DBM is interested to know the incidence of cancer in this population. Dr. Still pointed out that in some cases the fluoroscopes used are still available and a number of the x-ray technicians are still employed in the hospitals. Dosimetry presumably could be reasonably well established. A formal proposal to conduct the study has now been received by the Medical Branch. The recommendation from the Medical Branch is that a pilot study be conducted to ascertain how complete the follow-up data might be.

Adjournment.

The Committee reconvened at the AEC "H" Street Office at 8:30 A.M. on January 9, 1971.

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- 9 -

Dr. Moseley announced the results of the balloting for the AEC Citation. First choice was Dr. Charles Dunham, and second and third places represented a tie between Drs. Henry Blair and John Lawrence. The results of the ACBM's balloting have been sent to the Secretariat for presentation to the Commission.

Mr. John Whitnah reported on the problem of the balance between off-site and on-site research supported by DBM. The percentage devoted to off-site has gradually declined over the past 10-12 years. Since Fiscal Year 1972 is the fifth year in a row of a flat budget, the off-site research has continued to suffer. Dr. Cohen raised the question of whether the DBM staff is satisfied with the performance of the research on-site. Is it uniformly as good as research conducted off-site and how carefully is it scrutinized? Mr. Whitnah said that the 189's did give a mechanism for scrutiny and that dollar amounts were assigned to each 189 by the particular Branch involved. The DBM budget as represented by the President's budget for FY 1972 is 88.3 million. There was a general discussion of how to get rid of weak programs at on-site laboratories. Dr. Totter pointed out that he is asking key laboratory directors to come in to discuss with him and to reach agreement on cutting weak programs. The branch chiefs at Headquarters have been asked to identify weak programs within their branches as well as weak laboratories. Dr. Burr said that the Commission is exploring the possibility of the National Science Foundation helping in the funding of research, particularly for the Division of Research. Dr. Edington raised the question of whether DBM could keep the money if it closed a laboratory. Dr. Totter still feels that DBM would lose the money in such a case.

It was not clear how the Advisory Committee could help with this very difficult problem. The Advisory Committee cannot have the necessary detailed knowledge of all programs in all laboratories to enable it to advise. Dr. Cohen reiterated his argument that the AEC image should and would be improved by increasing the funding for DBM. Dr. Stout felt that the national laboratories will increasingly become more and more valuable as national resources. He believes that the pressures on universities are such that they will become less important in research in the near future. For the next decade he expects emphasis will be on applied research and that the national laboratories are equipped to handle such research, while the universities are not.

Dr. Barr reported on the LRL Livermore site visit. Dr. Shore and his staff at the Biomedical Division of LRL Livermore apparently worked very hard and did a very good job of presenting their case. Dr. Batzel, the Associate Laboratory Director at Livermore, attended most of the meetings. Dr. Barr personally felt that the science had improved considerably since the review two years ago. Many of the weak points that were identified by the review committee two years ago have been removed. The publication records from Shore's Division is now reasonably good. Dr. Arthur Tamplin,

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1071778

however, apparently is no longer doing any research. Dr. John Gofman's chromosome work was reviewed but the comments from the outside reviewers are not yet available. Dr. Totter said that the reviews would be sent to Dr. Batzel and any actions that are taken would be done in concert with Dr. Michael May and Dr. Batzel. At this point Dr. Cohen requested that the Division of Biology and Medicine provide the review material to the ACBM for consideration at its next meeting. He felt strongly that if the science is not good it should not be supported in fairness to other investigators. He felt further that it is incumbent on DBM to reduce its support of bad science if, indeed, it is bad. Dr. Cohen did not feel that who was doing the bad science was of any particular importance. The Advisory Committee felt that the whole question of support of research in the Biomedical Division at Livermore should be resolved at an early date. The Committee is not presently in a position to judge whether the research is good or bad. If it is good, it should be supported. If it is bad, support should be drastically reduced. Dr. Schull, who was a member of the site visiting team, was asked to draft a resolution for circulation to the committee for consideration. The sense of the resolution would be to ask for a quick resolution of the problem of support for the Biomedical Research Group at the Lawrence Laboratory.

The ACBM then went on to the question of providing nominees to the General Advisory Committee for the E. O. Lawrence Award. Dr. Moseley initially disqualified himself since he had nominated some of the candidates. Once the number of candidates had been reduced to three, none of whom Dr. Moseley had nominated, he again took part in the proceedings. Dr. Laughlin, who was unable to be present, voted by proxy. The outcome of the voting was that Drs. Auxier and Petersen tied as first choice with Dr. Mortimer the third choice. The ACBM voted to instruct the Chairman to express preference for Auxier because of his age (he becomes ineligible next year).

The question of a replacement for Dr. McGee was discussed briefly but no action was taken.

Minutes of the 136th meeting were approved.

If there is a March meeting of the Committee, it will be held March 12-13. The May meeting is tentatively scheduled for May 14-15. On behalf of Dr. Howard Adler, Director of the Biology Division at Oak Ridge National Laboratory, Dr. Storer invited the ACBM to meet at the Biology Division.

The ACBM endorsed Dr. Stout's position on stable isotopes. The Chairman will inform the Commission that a position paper prepared by one of its members (Dr. Stout) will be circulated to them through DBM.

1071779

DOE ARCHIVES

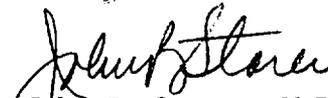
The proposed contents of the Chairman's letter to Dr. Seaborg were discussed. Dr. Cohen asked that the ACBM take the position that the project being conducted by Dr. Mancuso should be phased down and soon phased out on the grounds that the objectives have been lost sight of. Dr. Totter felt that the presentation made to the Committee was not adequate for such a decision. The ACBM therefore decided to recommend instead that the study not be expanded until a critical look is taken at the data and that DBM take this critical look.

Comments on the question of how long film badge records should be kept will be included in the letter to the Chairman.

Dr. Cohen gave a delightfully interesting report on his recent visit to scientific institutions in Cuba.

The Committee adjourned at 11:45 A.M., January 9, 1971.

Respectfully submitted,



John B. Storer, M.D.
Scientific Secretary, Advisory
Committee for Biology & Medicine