

GENERAL SCIENCE

Battery Additive Hearings

Senate Small Business Committee holds hearings to determine whether treatment of battery additive and its manufacturer by government agencies was "fair and just."

Hearings before the Select Committee on Small Business, U. S. Senate, began on June 22 with testimony by Jess M. Ritchie, who presented his widely publicized views and charges against the Bureau of Standards and other government agencies in connection with their handling of AD-X2. The following excerpts are from Dr. Astin's testimony which followed on June 23 and which was the first Bureau of Standards statement on the controversy.

By DR. ALLEN V. ASTIN

Director, National Bureau of Standards

I appreciate this opportunity to appear before the committee in order to attempt to clarify some phases of the controversy involving the work of the National Bureau of Standards on battery additives.

First I should say I believe that on strictly technical phases of the battery additive problem disagreements should be resolved by a group of technical experts. I am pleased that a committee of the National Academy of Sciences was recently set up for such a purpose and I have no hesitancy in seeing the Bureau's work on this matter subjected to their critical scrutiny. [See page 8.]

I have, in fact, urged such an investigation ever since it was apparent that responsible individuals had doubts as to the adequacy of the Bureau's work on battery additives. There are, nevertheless, a number of aspects of the battery additive matter that can be readily discussed here.

In order to provide a suitable background for my statement on battery additives, I would like first to give a brief review of the Bureau's functions and operations and a description of its testing procedures. . . .

The activities necessary to carry out the six authorized basic functions include research and development in all major fields of physics, chemistry, metallurgy, engineering and mathematics. In general, the Bureau's activities can be grouped under either of two major objectives: (1) to serve the government as a scientific laboratory and (2) to serve the nation's science and industry by establishing and maintaining the fundamental standards of science, related instrumentation and measurement methods, and the provision of such services as calibration. . . .

Testing for Regulatory Agencies

A small part of this relatively small testing program [the latter being approximately one percent of the Bureau's activities], wherein the Bureau acts as a service

laboratory for other Government agencies, is concerned with tests for agencies having regulatory authorities. The total of all regulatory-type testing done for these other agencies, at their initiation and request, is less than \$25,000 per year. In short, testing of this kind done by the Bureau comprises less than a twentieth of one percent of the total NBS program. It is within this category that the Bureau's interest in the battery additive matter originated. . . .

The Bureau has no program of endorsing, approving or condemning proprietary products. This fact is frequently not understood by the public since we receive many requests for such service which have to be turned down. There are also occasional claims of NBS approval in the advertisements of some products. These can usually be corrected by correspondence.

The reports the Bureau prepares on tests of materials and products for other Government agencies are considered the property of the agency for whom the test is made. Consequently the control of the dissemination of the information in these reports is the responsibility of the agency requesting the test. . . .

Types of Measurements

First, we have to consider what measurements are of importance in evaluating battery performance. Batteries are intended to supply electrical energy. Hence, it is important to have some criteria by which a battery's ability to supply electrical energy can be measured. This is usually done in watt hours or ampere hours assuming a constant voltage.

The next most important characteristic in evaluating battery performance is its probable life. For automobile storage batteries this is usually expressed in terms of months or years. Another important measurement on a storage battery is its efficiency; this involves the ratio of the energy necessary to charge a battery to the energy the battery can return in doing useful work. . . .

Laboratory and Field Tests

If one is able to discover in controlled laboratory experiments . . . an effect which offers improvement in battery performance, it would next be necessary to extend the tests to be sure the effect or improvement still persists under the more rigorous conditions of actual use. This would probably involve what have been commonly referred to as field tests. There has been some criticism of the Bureau's work on battery addi-

tives because we have not as of the present time resorted to field tests. . . .

The Bureau has not resorted to field tests with battery additives because it has not been possible to find in the laboratory any effect which is related to the normal use of lead-acid batteries. If a pertinent effect were found in the laboratory, then a field test might be necessary before a final evaluation could be obtained. Since, however, no worthwhile effect has been found in the laboratory, it has been concluded that the field tests would serve no useful purpose. Furthermore, in field testing, large variations in environmental conditions are likely, and it requires much more extensive planning, larger samples and more rigorous analysis of the data to obtain results of reliability and significance.

NBS Battery Work

The Bureau's work on batteries goes back to the very beginning of the organization at which time it dealt with work on the primary standard of electromotive force, the volt. [Dr. Astin then described some of the Bureau's previous, fundamental work on batteries.]

The Bureau's work with battery additives, materials intended to improve the performance of lead-acid type storage batteries, goes back to the early 1920's. A technical paper summarizing the results of these early investigations was published in the transactions of the American Institute of Electrical Engineers in 1925.

[Dr. Astin then summarized the history of the Bureau's evaluation tests on battery additives.]

Battery Additive

The first recorded contact at the Bureau with the Battery Additive AD-X2 occurred in April, 1948, when Dr. Merle Randall, consultant of Pioneers, Inc., wrote to Dr. George W. Vinal, then chief of the Bureau's electrochemistry section. Dr. Randall described AD-X2 (it was then called Protecto Charge) as a powder mixture of anhydrous sodium sulfate, and slightly basic nearly anhydrous magnesium sulfate, and he claimed that this combination of the salts yielded results appreciably different from ordinary mixtures of the two salts.

It might be of interest to point out that in this letter Dr. Randall claimed that the additive was an invention of one Donald Keefer, the patent rights to which had been acquired by Mr. Jess M. Ritchie, President of Pioneers, Inc., the company which manufactures the additive. Dr. Vinal deferred replying to Dr. Randall's letter and again in June of 1948 Dr. Randall wrote Dr. Vinal, reemphasizing and expanding the claims made for this material in his first letter. Included with his second letter was a special test which we have subsequently called the Randall test and which was claimed to be a very severe test for these additives and which yielded "striking results." . . .

Also, in one of Dr. Randall's letters of July, 1948, was a statement that in one experiment with these additives, treated batteries had remained in service without a single failure for as long as 17 months. This is interesting in the light of more recent statements that the additive was not invented until the fall of 1947. . . .

The Bureau's tests have shown that the material is primarily a simple mixture of sodium and magnesium sulfates and that there is no evidence of a compound or alum structure. The analysis also showed a number of trace elements but for the most part these are the same trace elements usually found in varying amounts in commercial grades of sodium sulfate and magnesium sulfate or in the normal battery electrolyte.

It is also pertinent to note in connection with the claim of the uniqueness of the composition of AD-X2 that our analyses have shown variations between samples as high as 19% in the ratio of sodium sulfate in AD-X2 to the magnesium sulfate. The ratio of the quantities of trace elements also varies appreciably.

The results of these tests showed that the effect of AD-X2 in a battery electrolyte was no different from that of other mixtures of sodium and magnesium sulfates and that none had any measurable effect on the performance of a lead-acid storage battery. . . .

Why AD-X2 Was Tested

First, every action which the Bureau has taken with respect to the testing of AD-X2 and the dissemination of information with respect thereto has been brought about as a direct consequence of the representations and pressures of the proponents of AD-X2.

The Bureau became aware of the existence of the product first by approaches made by the manufacturer, and initially declined to make any tests on it because there was no reasonable evidence that the product was, in fact, different from any of the other numerous additives the Bureau had previously tested, and also because the Bureau does not evaluate proprietary products for individual manufacturers.

The initial tests made by the Bureau came about largely as a result of inquiries and suggestions from the Oakland Better Business Bureau and from Senator Knowland, their inquiries in turn being instigated by Pioneers, Inc. The subsequent dissemination of information about battery additives came about largely as a result of pressures applied to the National Better Business Bureau to make unwarranted exceptions in the case of Battery AD-X2. . . .

Congressional Interest

Beginning in July, 1951, the Bureau began receiving numerous letters from members of the Congress requesting information about AD-X2. In general, these letters were instigated by various distributors of Pioneers, Inc., through writing to their Senators. During the last half of 1951, 28 Senators and

one Congressman transmitted queries about this material. . . .

An indication of the motivating force behind this letter-writing campaign can be seen from the following excerpt from a nine-page memorandum of August 21, 1951, sent from Battery AD-X2 Plant No. 236 to "All Distributors, Prospective Distributors and Interested Parties" on the subject "National Bureau of Standards versus Battery AD-X2"; "We are now trying to bring to bear sufficient pressure to cause a Senate investigation of National Bureau of Standards."

"We certainly have reason to believe that an investigation and perhaps a shake-up are in order. A few days ago, about the time that all distributors of Battery AD-X2 were writing their Senators (see attachments 'F', 'G', and 'H'), Dr. Edward U. Condon, for many years the Director of the National Bureau of Standards, suddenly resigned. We believe that this is significant and we like to believe that we had something to do with the resignation."

Most of the letters from the Congress were routine memoranda transmitted with the letters they had received from distributors in their areas. Others suggested the desirability, if possible, of the Bureau's making additional tests in order to settle the controversy. For example, the following request was received from the then Senator Nixon in February, 1952: [Vice-President Nixon's letter suggesting additional tests then followed.] . . .

Manufacturer Approved Batteries

An essential feature of this test which was carried out in June, 1952, was that the batteries which were used for the test were to be disassembled and inspected by Mr. Ritchie or his representative and returned to the Bureau as suitable for complying with the objectives of the test. This was done by Mr. Ritchie and Mr. F. A. Harrell in the latter's battery shop in Arlington, Va. Mr. Ritchie did say that these batteries were not as badly sulfated as he had hoped, but that he did believe them suitable for the test. Most certainly the test would not have been conducted if he had not given such assurance. . . .

Here I believe that it is important to point out that had we put AD-X2 in all of the batteries rather than in just half of them, we would have duplicated the experience reported by most of the proponents of AD-X2. Here was a group of batteries which a prior owner had claimed would not take a charge. AD-X2 was put into one-half of them and they took a charge. However, nothing was put in the remaining half and they also took a charge and performed just as effectively as the treated batteries. . . .

Manufacturer Participation

The attempt to verify [Mr. Ritchie's] claims was made by a group of judges including Mr. Ritchie and an assistant of his. None of the judges knew which plates came from treated and which from untreated batteries; they were asked merely

to compare the plates and to rate them. None of the judges, including Mr. Ritchie and his assistant, was able to tell any consistent difference between the treated and untreated batteries. . . .

At the September meeting [at the Bureau to discuss possible future tests] there was some discussion about Bureau participation in MIT tests if such tests took place, but no definite decisions were reached. When the Bureau was informed that MIT was planning to make tests and invited to have observers present, it was concluded after some serious deliberation that it would be better if the Bureau did not participate in these tests.

A major factor influencing this decision was Mr. Ritchie's attitude toward the Bureau and Bureau personnel. He stated emphatically at the September meeting that he would believe no results which were not favorable to his product and that he did not believe Bureau personnel could be depended on to give a fair test. In our desire to bring this controversy to a satisfactory close, we concluded that it would be better if MIT carried out its tests completely independently. . . .

A major conclusion of the Bureau's investigations with respect to the effect reported by MIT is that the effect is observable in the batteries only with electrolyte of extremely dilute acid concentration. . . .

Science News Letter, July 4, 1953

GENERAL SCIENCE

Comparative Statements In Battery Additive Case

► FOR A compilation of comparative reports on the battery additive case, involving the National Bureau of Standards and the battery additive tradenamed AD-X2, the April issue of *Chemistry*, SCIENCE SERVICE magazine, may be consulted. This issue will be sent on request to SCIENCE SERVICE for 50 cents, postpaid.

Science News Letter, July 4, 1953

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See Upset of Public Safeguarding Procedures

► UPSETTING OF the whole, historically tested government procedure of safeguarding the public from fraudulent business practices is involved in the hearings held by the Senate Small Business Committee on the controversial battery additive AD-X2.

The purpose of the hearings, conducted by Sen. Edward J. Thye (R.-Minn.), is to secure action by the Post Office Department on the suspended fraud order outstanding against the "small business man" and his firm producing the battery additive.

Sen. Thye feels that the existence of even an inoperative fraud order during the year that he estimates it will take the National Academy of Sciences committee to report will damage the business. A suspended fraud order does not stop receipt of mail.

Science News Letter, July 4, 1953