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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

APR 3 1980

Clifford A. Burchsted
710 River Bend Road
Clinton, TN 37716

Dear Mr. Burchsted:

Your letter to President Carter about the Three Mile Island nuclear plant accident has been referred to me. I regret that this answer to your letter has been delayed. The accident and its consequences have created a substantial increase in the agency's workload, which has prevented me from responding to you as promptly as I would have liked to.

Thank you for supplying me with information on your Handbook. I am enclosing a copy of the complete report of the President's Commission on Three Mile Island which will give you all the information you requested on the air cleanup systems of the plant. It should help you to update the next edition of your handbook.

I appreciate your concerns and assure you that every effort is being made to ensure the continued protection of the health and safety of the public, not only at the Three Mile Island Station, but also at all nuclear power plants.

Sincerely,

Harold R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Encl: Report of the President's
Commission on the Accident
at Three Mile Island

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710 River Bend Road
Clinton, Tennessee 37716
April 11, 1979

Hon. Jimmy Carter
President of the United States
The White House
Washington, D.C. 20500

(511)

Dear Mr. Carter:

In your press report yesterday you stated that an investigation would be made of the Three-Mile Island nuclear plant accident. A secondary, but still important aspect of that accident was the performance of the air cleanup systems of the plant. Why were measurable (although insignificant) quantities of radioiodine released? Why are the auxilliary building exhaust systems both nearing exhaustion so rapidly, and why had not one been turned off to operate the system at reduced flow (and thereby extend the life of the units)? Why was it necessary to install new hydrogen recombiners, and what happened to the in-containment recirculating air cleanup systems? How are airborned contamination levels in the containment to be reduced, and what provision can be made for remotely maintainable filter systems? These questions, and probably others concerning the plant's air cleaning systems, deserve answers. The *Nuclear Air Cleaning Handbook* (see attached book review from British publication, *Filtration & Separation*), which is still the only text on the details of design of these systems, sets forth the requirements for converting the system designer's concepts to an on-line operating system, capable of performing reliably under plant conditions, both normal and post-accident. To what extent the designers of the Three-Mile Island air cleaning systems followed -- or ignored -- these recommendations, I do not know. I would be greatly interested in following the course of your promised investigation, however, if for no other reason than to obtain information needed to update the next edition of the handbook noted above. I would appreciate being kept informed of the findings of the investigation as they relate to this subject, and will be very happy to provide any information you need or assist within the limits of my technical specialty.

Sincerely yours,

Clifford A. Burchsted

Clifford A. Burchsted
Sr. author, *Nuclear Air Cleaning Handbook*

Book Reviews

Nuclear Air Cleaning Handbook

USA Energy Research and Development Administration. C. A. Burchsted, J. E. Kahn and A. B. Fuller. 290 pp. $12.25. US Dept. of Commerce, 5285 Port Royal Road, Springfield Va. 22161.

In the USA as in all countries where nuclear programmes exist, tight security has surrounded the industry ever since its military possibilities became apparent. Despite this, technical information relating to the cleaning of contaminated airstreams was released and published in the USA at an early stage. Throughout the last 25 years the US Atomic Energy Commission (now ERDA) has been sponsoring biennial conferencies on nuclear air cleaning.

These conferences encouraged the fullest possible interchange of information and experience between the various US nuclear establishments. An international flavour was soon acquired as participants from other countries began to contribute. The resultant spread of knowledge has undoubtedly assisted in the safe and rapid exploitation of nuclear energy. The immediate publication of information concerning failures and incidents has helped others to avoid similar mistakes.

As the industry has grown so the immediate problems have changed. The solutions of some have led to others. For example, early HEPA filters were combustible to permit disposal by incineration: fires in filter systems brought the development and use of non-combustible filters. A filter disposal problem now exists. Regular on-site testing followed the discovery of faults in filter systems. The problems of removing radio iodine from air or air/steam mixtures, and of collecting aerosols of sodium oxides have followed on in turn. Many hundreds of papers covering various aspects of these and other topics have been presented and discussed in these conferences.

In 1970, two of the authors of the present volume produced "The Design, Construction and Testing of High Efficiency Air Filtration Systems for Nuclear Application." This was a survey of current practice supplemented with a distillation of information from conference proceedings.

The volume under review is subtitled "The Design, Construction and Testing of High Efficiency Air Cleaning Systems for Nuclear Application." It is a revised and enlarged version of the earlier work. The scope has been widened to include material on methods of air cleaning other than HEPA filtration.

The Nuclear Air Cleaning Handbook is intended for engineers—the designers and operators of air cleaning systems in nuclear establishments. It gives detailed descriptions of current US practice in this field. As well as being a survey of current practice to some extent it provides an historical record. The experiences of many who have worked in nucear air cleaning since its beginnings have been written down in a permanent and usable form. Their successors will benefit inestimably from the wealth of systematically presented information. The authors have made notable contributions of their own to research and development in the subject. They are to be congratulated on completing the mammoth task which compiling this handbook undoubtedly has been. As with any "bible" the authorship is vested with the teams of contributors and reviewers who provide the detailed information as well as with the author/editors who shape and style the complete volume. From the names of those involved in this project it is clear that the

book justifiably ranks as the most authoritative state of the art survey of nuclear air cleaning which has yet appeared. The large format paper back production makes it more of a desk book than a hand book. Production costs have evidently been kept as low as possible in order to encourage widespread distribution. It is well written and presented, thoroughly checked and in consistent style throughout. Reasons and explanations are uniformly lucid and comprehensive.

There are nine chapters. Appendices are devoted to standards, comparative estimates, an updated version of "Care and Handling of HEPA Filters" by H. Gilbert and J. H. Palmer and some notes on seismic design. An introductory chapter defines the overall scope of the work and gives what must be (especially for non US readers) a helpful glossary of jargon and acronyms. A second chapter examines the purposes and functions of air cleaning systems and indicates how the special needs of particular installations can affect the design of a filtration system. The next three chapters deal respectively with what are termed "internal components"—filters, adsorbers, demisters, etc—"housing design and layout" and "external components"—ductwork, fans, dampers, etc. Apart from detailing essential design features these chapters illustrate many examples of design faults which have resulted in sub-standard installations. Small single filter units including portable emergency air cleaning units are described together with "bag-out" techniques which are used for replacing contaminated filters. A glove-box filtration chapter provides a very useful summary on design and safety considerations in air filled glove-box systems.

The testing of filter systems is given its due emphasis. To quote:

"No safety credit can be claimed for HEPA filters or adsorbers that are not tested regularly." Widespread misconceptions which exist about DOP testing can be removed by reading the following quote: "In place tests of HEPA filter installations are made with an aerosol of polydispersed DOP having a light scattering NMD of 0·7 μm and a size range of 0·1-3·0 μm. The DOP used for efficiency testing by manufacturers and ERDA quality assurance stations is a monodispersed aerosol having an NMD of 0·3 ± 0·0. μm." ". . . . . compressed air and gas thermal DOP generators must not be confused with the equipment used by manufacturers or ERDA quality assurance stations for predelivery efficiency tests on HEPA filters."

The final and longest chapter deals with special requirements in particular applications and is copiously illustrated by examples from various nuclear installations. In addition to the literature references at the end of each chapter which together run into hundreds, there are some 220 diagrams (one of them duplicated) and photographs and over 40 data tables. A reading list of related documents classified according to their origin is given together with comprehensive contents and index listings.

Despite the comprehensive nature of the book a topic upon which more guidance might have been expected is that of filter changing procedure. The disposal of contaminated filters is not covered; although a closely related problem it is of course an exercise in solid waste disposal, and therefore environmental as well as technological factors need to be considered.

Current US practice is not typical of UK or European practice. Local factors which may be environmental or political in nature can affect the acceptability of procedures where disposal of radioactive effluents is concerned. In addition there exists frequently more than one acceptable method or procedure for solving or circumventing a particular problem. Substantial differences in US and UK practice exist in the areas of filter specification and glove box emergency extract systems, to name